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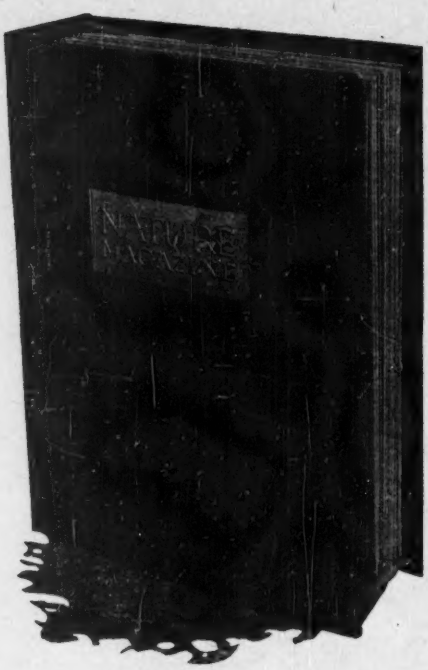

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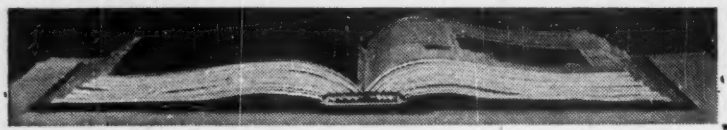

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Hawk Mountain

Hawks Aloft. By Maurice Broun. New York. 1949. Dodd, Mead and Company. Introduction by Roger Tory Peterson. 222 pages. Illustrated. $4.00.

This is the story of Hawk Mountain, and of one of the most dramatic achievements in wildlife protection. It is the story of a mountain top in central Pennsylvania past which many thousands of hawks, eagles, gyrfalcons and other birds fly on their migrations, and from which guns once blazed in senseless slaughter of these fliers. It is the story of the acquisition of this mountain top through the untiring efforts of Mrs. Charles Noel Edge, and its transformation into a vantage point from which the only weapons levelled against the passing birds are now field glasses and camera lenses. This is also the story of the birds and of the bird enthusiasts who come each year to witness these beautiful and dramatic flights. Of course, anyone who has ever visited Hawk Mountain will wish to own this book, and everyone who wants to visit it, but for one reason or another has not yet been able to do so.

Nature Index

Nature and Its Applications. By Jessie Croft Ellis. Boston. 1949. F. W. Faxon Co. 861 pages. $17.00.

This is a compilation of more than 200,000 selected references to Nature forms and to illustrations of Nature. It is the answer to the question: "Where can I find it?" The book is, of course, invaluable to the reference librarian, and is equally valuable to the school librarian who has access to a fair percentage of the books and periodicals indexed, as well as to anyone specializing in Nature in any way.

For the Worm

In Defense of Worms. By Frederick F. Van de Water. New York. 1949. Duell, Sloan and Pearce. 182 pages. $2.50.

If you number among your friends a literate follower of the immortal Walton, this little book is an ideal gift for him. In it Mr. Van de Water comes to the defense of fishing with worms.

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Nature in Print

By HOWARD ZAHNISER

Our interest in the other creatures that inhabit this earth is as varied as it is deep, but it seems to be dominated at any particular time or in any particular person by a fascination with the creatures that, like us, live and move and have their being, yet so differ from us as to seem strange indeed. Or else our interest is governed by a sympathy — a fellow feeling — with forms of life that, although drastically different from us, still seem to have so much in common with us in sharing this great miracle of Life. The most fascinating of all creatures to many of us are the insects, and he whose fascination for them has become most famous is undoubtedly J. Henri Fabre, whose writings have recently been presented to us anew by Edwin Way Teale in a volume entitled *The Insect World of J. Henri Fabre*. Another recent volume, *The Voice of the Coyote*, by J. Frank Dobie, is a superb example of the sympathetic interest that a man can take in an animal of another species. It has been a worthwhile experience to read them, one after the other, and to think of them together, and the experience has been all the more worthwhile because each of these books is also within that specially honored domain of writing that we call literature. Each is a volume of special excellence.

In forty selections, each with an apt and helpful editorial paragraph at its beginning, Mr. Teale has brought "into the compass of a single book the most famous of Fabre's studies, many of them now out of print." Mr. Teale has also contributed to the volume a biographical introduction that is at once a discriminating and admiring essay on this French student and observer (of insects), who wrote so vividly and charmingly of his observations, and who, as the "humble chronicler of the commonplace," became one of those few men who, as Mr. Teale says, are "symbols of a way of life or an attitude of mind." In fact, Fabre himself is as fascinating as his own accounts of the insects that so absorbed his attention. Mr. Teale is among those who best understand this. He, too, has known what it is to live, as it were, within the insect world and then to fashion literature from his recollections of the experience. There is no one who could better present Fabre to us, no one whom we could better trust to select from the many volumes what will best make up a single book.

If there is one regret it is that our editor has not himself written more of his author. We could have enjoyed a further discussion of Fabre and his writings, and would certainly have valued an annotated bibliography. Yet we can only sympathize with the obvious purpose of presenting the maximum of Fabre with the minimum of comment. And we can congratulate both Mr. Teale and ourselves that here in one book are so many of the most fascinating of Fabre's descriptions of what he saw with his wonderfully patient and keen eyes. Although he lived to be ninety-two, Fabre — as Mr. Teale points out in a characterizing comment — "never lost his zest for the insect world with its multitudinous mysteries. And no man ever lived who transmitted that enthusiasm to more of his fellow-men." We are duly cautioned in this volume as to the limitations of Fabre's science and his overemphasis on "the belief that instinct sticks to its course like a train on its rails," but essentially what we have here is a faithful and fervent transmittal of the enthusiasm that Fabre himself shared — and the detailed facts through which the enthusiasm is induced and the mysteries perceived.

And what a book we do have here, also, in this work entitled *The Voice of the Coyote* — metonymically so called, for sure, for here in a volume of literature is as comprehensive and anecdotal an account of a species as another species might require for understanding and interest! And illustrated, too, by Olaus J. Murie with forty drawings that are remarkable not only for their vitality and their intrinsic interest and meaning, but also for their skillful and sympathetic interpretation of Mr. Dobie's reports and comments.

"Originally," says Mr. Dobie, in an introductory essay on the coyote and man, "I intended to make this book only a modest collection of coyote tales which their tellers had delighted me in telling, and which I delight in telling in my own way. Treatment of the animal's characteristics was to serve as a kind of preface. Gradually natural history took dominance over tale. In the year 1921 I began setting down some things I heard about Senor Coyote and making notes on his record in print, but a full quarter of a century before that, while I was listening to the crickets behind the baseboards against the rock walls of our ranch home in Live Oak County, Texas, and to my mother's sweet voice, the coyote was talking to me. I did not at the time know that he was talking to me, but he was. As I have gone along with the tales and the natural history, I have come to the conclusion that nobody can understand either without some knowledge of the other."

Here are some tales all right — Sir Reynard and Don Coyote, Repaying Good with Evil, Moral Things, The Coyote and the Old Dog, Brother Coyote and Brother Cricket, The Race Is Not to the Swift, Coyote and Fox, Why the Coyote Does Not Eat People, Coyote Between Two Sheep, Coyote Meets the Tar Baby — but before the reader reaches these tales he has traversed three hundred pages of rich and well spiced learning and lore, all written with the eloquence of the fireside speech of a man who knows his subject and can reach for the apt quotation on a whole tier of bookshelves. The chapter titles themselves are revealing — "The Father of Song Making," "Adaptation," "Taking Advantage of the Situation," "Co-operation," "Call Thou Nothing Unclean," "Scent and Curiosity," "Trapper and Trapped," "Biological," "In Fields of Psychology and Sport," "The Coyote Comes to Man," "Roma, Carlos and Other Captives," "Playing Dead," "Folklore Oddities," "Coyote's Name in Two Tongues," "Hero-God, Trickster and Tricked," and "Good Medicine."

The great characteristic, however, of this volume, with all its excellencies, is its demonstration of the sympathy of a human being for another creature. "Not even the most scientific mammalogist can comprehend the whole animal without hospitality toward the stuff of dreams that this more than mere mammal has influenced human minds to weave around him," Mr. Dobie declares. Yet he has to admit that "sympathy for wild animals, sympathy that is intellectual as much as emotional, has not been a strong element in the traditional American way of life." He speaks of "the sympathy that comes from

Sonnet to John Steven McGroarty

By ADELAIDE COKER

O Poet, from the green Verduga hills,
Time's sea has whispered many years away
Since your departure, and a desert fills
My heart's most inward span; and yet, today
I knew that you had never truly gone,
For in the white-plumed chaparral the stirrings
Of fragile feathered wings in the new dawn
Spun lyrics to you with their tender whirrings.
But more, I heard the deep eternal themes
Of your work in the wondrous symphony
Of live oak winds and purling mountain streams.
Ah, yes, great Poet, you will always be:
And all because the beauty of your mind
Lives on in golden words you left behind.

civilized perspective" and says:

"Among the wise, this civilized sympathy infuses knowledge. It is a kind of cultivated gentleness. It is foreign to harsh and boisterous frontiers and comes after many of the wild creatures to which it is directed have been destroyed."

It is this sympathy, thus so understandingly defined and characterized, which infuses all the ecology and biology, all the folklore and history of *The Voice of the Coyote*, and makes of it a work that must not be missed by any of us who are interested in the other creatures who share this earth with us — and in the wildness of which they are so essential a feature.

The Insect World of J. Henri Fabre. With Introduction and Interpretive Comments by Edwin Way Teale. New York: Dodd, Mead & Co. 1949 xvi + 333 pp., with index and end-paper montage comprising portrait of Fabre, view of the house at Serignan, and 12 insect pictures. $3.50.

The Voice of the Coyote. By J. Frank Dobie. Boston; Little, Brown and Co. 1949. xx+ 386 pp., with 40 drawings by Olaus J. Murie, 10 other text figures, appendix of notes, essay of acknowledgments entitled "My Creditors: Books and People," and index. $4.

About Spiders

American Spiders. By Willis J. Gertsch. New York. 1949. D. Van Nostrand Company. 284 pages. Illustrated in color and black and white. $6.95.

Most welcome addition to the natural history library shelf is *American Spiders* by the Associate Curator of the Department of Insects and Spiders of the American Museum of Natural History. Requests for reference to a good spider book in the past have been difficult to answer, but now we have the ideal book to suggest. Fifty-four color plates, supplemented by black and white pictures, make the volume useful as an identication text, although it is not basically intended for that purpose, but is, rather, a fascinating story of the spiders one encounters in the temperate parts of North America. The text is entertainingly written, for the author not only knows the animals about which he writes but has a deep appreciation of them.

California Poppy

Trodden Glory. By Cameron Rogers. Santa Barbara, California. 1949. Wallace Hebberd. Foreword by Stanley Walker. 130 pages. Illustrated. $2.50.

This is the story of a flower — the California poppy — and it is the story of men who, in their explorations, were associated with it. These were Archibald Menzies, Adelebert von Chamiso, David Douglas, and others. It is also the story of early days in California; delightfully written history, full of eloquence and learning.

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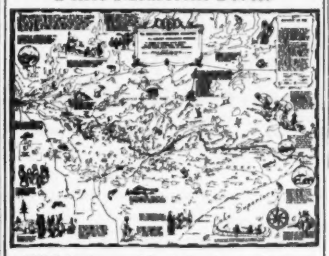

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4.☐ Audubon Bird Notes
5.☐ Wild Bird Post Cards
6.☐ Flower Post Cards
7.☐ Audubon Bird Post Cards
8.☐ Game Bird Christmas Card-Calendar
9.☐ Flower Christmas Card-Calendar
10.☐ Game Bird Prints
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12.☐ Flower Prints
13.☐ Audubon Bird Prints
14.☐ Game Bird Appointment Calendar
15.☐ Ruddy-Duck Book Plates

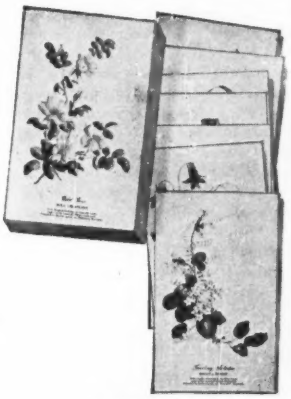
If you do not wish to mutilate your copy of the magazine, and write separately, be sure to fully describe items desired.

NAME.....

STREET and No......

CITY.....**Zone**.....**State**.....

Correspondence Notes



Postal Cards

Christmas Cards and Gift Calendar

Large Print Sets

AMERICAN NATURE STUDY SOCIETY

Our past President, Edwin Way Teale, has arranged a program this year that should make every member want to be in New York for the Annual Meeting, December 27-29.

As one would expect of a photographer-writer, Ed has set up a panel of experts on Nature writing, and another on Nature photography. Some participants have appeared on our programs in other years, others you will meet for the first time. All are outstanding authorities, and are speakers you will want to hear.

Our Tuesday afternoon session on December 27 will be devoted to Nature writing and Nature books, with Ed Teale presiding and the following speakers participating in the discussions: Ellsworth Jeager of the Buffalo Museum of Natural History — Nature writing; Roger Tory Peterson, artist, lecturer, writer — illustrating Nature books; Raymond T. Bond of the Dodd, Mead Publishing Company—publishing and promoting Nature books; Howard Zahniser of the Wilderness Society and the staff of *Nature Magazine* — reviewing Nature books.

On Wednesday afternoon, December 28, President Richard W. Westwood will serve as chairman of the session on Nature photography, with the following speakers: Allan D. Cruickshank of the National Audubon Society—bird photography; Edwin Way Teale, writer, photographer and lecturer — insect photography; Rutherford Platt, photographer, naturalist — plant photography; and S. Glidden Baldwin, of Danville, Ill., doctor, photographer, writer — photographing trees.

On Friday, December 29, you will want to join the rugged outdoorsmen on a field trip to the coast, probably in the Jones Beach area, to study ecology and to see any wintering birds available. Ed Teale, Allan Cruickshank, Roger Peterson, and Richard Pough will be on hand to guide the group over this interesting region.

The local Nature clubs in the New York area will exhibit some of their Nature projects in the meeting rooms at the Society headquarters in Hotel New Yorker.

Reports of the various club activities will be a part of the annual business meeting Tuesday evening, with delegates reporting from the New York Chapter; Bangor (Me.) Bird Conservation Club; Watchung (N.J.) Nature Club; Eastern Nazarene College Club (Mass.); Natural History Society of Eugene (Ore.); Nature Society of the Klamath Region (Ore.); and the new Western or Pacific Branch of the American Nature Study Society.

The outstanding news of the year comes from the west coast where more than one-hundred new members have been enrolled by Dr. Ruth Hopson and an active committee. The Pacific Branch was organized at a special meeting last spring in Vancouver, British Columbia, when the Pacific Division of the AAAS met. This was the first time a group sponsored by the American Nature Study Society has met outside the United States. Dr. Leo Hadsall of Fresno, California, was elected President; Dr. Elmo Stevenson of Ashland, Oregon, Vice-President; Dr. Kenneth Gordon of Corvallis, Oregon, Secretary-Treasurer, and Dr. Ruth Hopson of Eugene, Oregon, Representative on the Board of the Society. Dr. Hadsall and Dr. Hopson plan to attend the New York meetings.

The morning sessions on December 27, 28 and 29 will be cooperatively sponsored and attended by all of the science education groups, with the National Association of Biology Teachers, and the American Nature Study Society, responsible for the session on Wednesday, December 28. This will be a discussion of the recent developments in biology.

If you plan to attend the meetings and need a place to stay you had better send in your hotel reservation promptly to Miss Sylvia T. Peltonen, Manager of the Housing Bureau, 500 Park Avenue, New York City 22. Indicate at which hotel you would like to stay and what space you will need.

Additional information about the program and the advantages of membership of the American Nature Study Society can be obtained from the Secretary-Treasurer, Richard L. Weaver, P.O. Box 1078, Chapel Hill, N.C.

All who plan to attend will want to register with the American Association for the Advancement of Science in order to be eligible to attend all the meetings being held in New York at that time. The combined registration fee for all meetings is $3.00, and advance registration can be made to Dr. Raymond Taylor, 1515 Massachusetts Avenue, N.W., Washington 5, D.C.

NATIONAL ASSOCIATION OF BIOLOGY TEACHERS

The National Association of Biology Teachers, as an affiliate of the American Association for the Advancement of Science, will again be meeting with that organization this coming Christmas time in New York City. Meetings are planned for the days of December 27-30, and in cooperation with the American Nature Study Society and the National Science Teachers Association, which jointly are planning meetings for the general morning sessions. These meetings will emphasize recent scientific research. The ANSS and NABT are responsible for the planning of the Wednesday morning session, December 28. Dr. Charles Mushett, from Merck Institute of Therapeautic Research, will discuss "Vitamin B_{12}, as a Nutritional Factor for Man and Beast". Dr. Gladys Hobby, bacteriologist from Charles Pfizer and Company, will present recent information about "Antimicrobial Agents", and Professor Harry Charipper from New York University will inform us about "Hormones in Relation to Blood."

NABT will have two afternoon meetings for biology and other interested teachers. Tuesday afternoon, December 27, in the North Ballroom of the Hotel New Yorker, the theme of the program is "Teaching Aids for the Biology Teacher from within the Classroom and Laboratory." Members of local and national biology clubs will demonstrate and explain methods, techniques, and procedures for presenting better biology to students. These will include visual aids, new biology courses, field trip ideas, classroom demonstrations, and science services.

The afternoon meeting on December 28 will be in Parlors F and G, Hotel New Yorker, and will emphasize the theme "Teaching Aids for the Biology Teacher from Outside the Classroom and Laboratory." A variety of educational, health and commercial sources of information, and assistance through outside agencies, will be presented.

Former all-day field trips with our affiliate, the American Nature Study Society, have proved so popular that another trip is planned for this year. Just where is being left to the ANSS and the local planning group in New York City. The New York Federation of Science Teachers also is aiding by planning a number of local field trips on Friday to points of interest in the city.

Thursday evening is the time for the cooperative banquet, where members of the three organizations get together and visit, as well as listen to a good speaker. NSTA is responsible this year for the program, and it is rumored that it will be on television.

If you are a biology or other teacher of science, plan on attending these meetings. You will gain new ideas, as well as acquaint yourself with the splendid membership of these three science education groups. If you have any questions concerning the NABT and the Christmas program, write to Miss Ruth Dodge, President of NABT, 24 East Linden St., Alexandria, Virginia.

Dunes and Beaches

Recently we noted receipt of a little booklet by Henry Curtis Ahl, R.F.D., Rowley, Massachusetts, dealing with some common insects of the Bay State. Now Mr. Ahl sends us another little booklet bearing the title of "Dunes and Beaches of Essex County." It is a brief discussion of the natural history of these dunes and beaches, and is available from the author at twenty-five cents.

Whence the Earth

"The Origin of the Earth" is the title of a booklet resulting from a University of Chicago Round Table discussion of this subject by Harrison Brown, Dirk Ter Haar, Gerard Kuiper and Rupert Wildt. Copies are available for ten cents from the University of Chicago, Chicago 37, Illinois.

Contents Noted

Two million, one hundred and twenty-seven thousand, five hundred and ninety-eight Federal duck stamps sold — spelled out, that figure seems, somehow, to accent the number of buyers and the gunning pressure placed upon our migratory ducks and geese. That figure was the total for the 1948-49 season, and it was a record-breaking sale of somewhat more than three times the number of stamps sold in 1935-36, the first year that this emblem was required in the possession of every duck hunter. For the statistically minded, California had the largest sale — 171,388 — with Texas second and Minnesota third. Stamp collectors purchased 11,257 stamps from the philatelic agency of the Post Office Department, and, probably, others from post offices. Some conservation-minded folks probably bought stamps in the hope that it would help the birds, but there is no way of telling how large this contribution might be. It is safe to say that more than two million stamps were purchased by gunners hopeful of getting their legal bag of birds as often as possible during the current season, when the ducks and geese make their perilous way south along their accustomed flyways. Certainly this number of gunners, and the liberalized season — in point of days, at least — combine to give scant reassurance about the future of the birds.

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One of our readers sends us a clipping, unfortunately failing to give us the source. As an editor we wish always to be meticulous about crediting our contemporaries and fellow editors, but in this instance we trust that our colleague will take the word for the deed as we pass this information along. It is reported that the City of Pittsburgh advertised to fill two vacancies on the municipal payroll. One was that of street-sweeper, for which important role the applicant must have an eighth-grade education; the other was for a naturalist, for which the applicant was required to present a college diploma with a major in the natural sciences. The salary offered for the sweeper of the streets was $4177 a year; for the naturalist, $2329.

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It is none too soon that a National Forest should bear the name of Gifford Pinchot, and it is appropriate that the forest selected for this honor should be the Columbia National Forest on the slopes of the Cascade Range in Washington. This forest was originally established and named when Gifford Pinchot was Chief of the United States Forest Service, and its administration was begun under his direction. Last June President Truman signed a proclamation officially changing the name to Gifford Pinchot National Forest, and in October the million and one-quarter acres were officially dedicated when the Society of American Foresters held its annual meeting in Seattle. Mr. Pinchot was born in the greatest era of national resource exploitation in our country's history; at a time when such exploitation was believed to be synonymous with progress and development. And he chose a profession then almost unknown in America — forestry. As the country's first "consulting forester" he discovered, however, that there were many who felt some concern for the future of our forest resources. In 1898 Mr. Pinchot became Chief of the Division of Forestry in the Department of Agriculture; in 1900 he helped organize the Society of American Foresters; in 1905 he became Chief of the new U.S. Forest Service and took over the administration of the forest reserves of the public domain. The rest of his life was devoted to the public service, with conservation ever foremost in his mind. No memorial to his contribution could be more appropriate than a great forest of green and growing trees.

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Much to the distress of many national and local sportsmen's groups, President Truman vetoed the Dingell-Johnson Bill — earmarking the excise tax on fishing tackle and accessories — on the ground that it involved undesirable precedent. The funds derived from the tax would have been set aside to be expended, on a cooperative basis with the States, to finance scientific studies and physical projects looking to fish restoration. This was the piscine counterpart of the Pittman-Robertson Act, which already earmarks excise revenues from the sale of arms and ammunition for cooperative effort in the restoration of game birds and mammals. Mr. Truman described the fisheries proposal as "more objectionable" than the Pittman-Robertson Law in certain details of its provisions. He preferred deriving funds from annual appropriation to the "arbitrary method prescribed in the bill." The President noted an unfairness in applying the tax on fishing gear exclusively for the benefit of the fisherman, pointing out that purchasers of numerous other articles of sporting equipment would pay a tax that goes to the support of general Government functions. Perhaps he feared a move on the part of the Washington Senators baseball club to divert the tax on bats, balls and gloves so that they could acquire some better ball players and get out of the American League cellar. While the veto of the bill is a sore disappointment to sportsmen who have worked for it for a decade, Mr. Truman's thumbs down, viewed dispassionately, is a most understandable gesture.

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This issue of Nature Magazine marks the conclusion of twenty-seven years of publication, and the start of a new year. And it gives us an opportunity to thank many loyal members and readers who have, during the year, encouraged us in our endeavors, given us the benefit of their suggestions and of their criticism. With the Christmas season closely upon us, we would like to wish one and all a happy holiday season, and again to renew our hope for the peace on earth, good will toward all men that still seems so elusive. R. W. W.

". . . last of all came a splendid buck, his white-tipped antlers gleaming."

Tracking Snow

By CLARENCE TILLENIUS

Illustrated by the Author

THE wind has died and across the distant fields the snow lies glistening, broken here by the black mound of a stonepile with its thickets of saskatoon and chokecherry, there by a stretch of meadow with clumps of golden willow sharp against the scalloped drifts. Across the flats march long zig-zag lines of fence bordered with sedge and matted weeds, haven of prairie hare and field mouse, hunting ground of fox and owl.

Tracking snow! What country-bred boy has not felt the stirring tingle in his blood at sight of that white expanse, which reveals by day a thousand stories of the lives and loves of the creatures that stir by night? What country-bred boy does not know the burning urge to see, to know, to ferret out more and yet more of the secret life of the wild, the gripping drama of life and death that has gone on since the beginning of Time?

The sun sparkles on the glittering snow. Lay by your work, shoulder a knapsack, and come with me for a day in the snowy wilderness. We will ramble and explore, we will own no other compulsion than the half-heard, whispering song of the distant woods, the beckoning of the valley beyond the farthest ridge, and the wild, exhilarating rush of gratitude just to be alive; to be one with the snow, the trees, and the sky.

Once, on just such a winter's day, a boy came driving a load of hay from a marsh far distant from the homestead. The sun shone warm, and the runners slipped easily along the hard-packed road. The boy tied up the reins and lay back in the hay, knowing that the horses, old and trusted, would keep the road trail. The sun beat on the boy's closed eyelids. The creaking of the harness and the hissing squeak of the runners combined in a soothing lullaby. Before he knew it, he had fallen asleep, lulled by sun and quiet.

". . . bordered with sedge and matted weeds, haven of prairie hare and field mouse, hunting ground of fox and owl."

A sharp jolt of the hayrack and the jingling of chains roused him; the horses were running away. He sat up, grabbed at the reins, and saw a sight that electrified him as it had the horses. Crossing the road, not fifty yards ahead, floating with a graceful up and down motion like so many swallows, came five white-tailed deer. There were yearlings and does, and last of all came a splendid buck, his white-tipped antlers gleaming. They were unafraid. Running lightly, each in the other's tracks, they reached the bushy border of the frozen marsh and stopped to gaze. A moment they stood, their great dark eyes questioning, then with a flickering of white tails they turned and disappeared in the tangled willows.

Today, more than twenty years later, that boy has only to close his eyes to bring back the scene — the flashing white and gold and brown of the leaping deer; the blue and violet shadows; the flying powdery snow. Such is the recompense granted the boy grown up on

"... bounding for his life in the deep, loose snow ..."

the edge of the wilderness. Material advantages he may lack, but one priceless boon he has — a memory stored with infinite riches; the memory of glorious days spent on marsh and hillside, in forest and on plain.

A sudden plunge through a crusted snowdrift cuts short the reverie, and before us is the meadow fence, with drifts heaped high about the clumps of willows. As we climb through the sagging barbed-wire, the dainty, daisy-chain tracks of the field mice invite a closer inspection. But wait! What is that long line of blue leading from the willow flats ahead? We hurry forward, hoping and half doubting. Yes! The track of a fox! Now we are in luck, for his is one of the most fascinating of trails to follow. He, too, has seen the tracks of the mice, and loped over to investigate, although apparently they were of little interest. His trail goes aimlessly, reconnoitering around the field until he reaches the old strawstack on the edge. Here he has circled cautiously around the stack, then suddenly, with a rush and a scramble, climbed to the top.

Here is his lookout tower, for from this high stack nothing that moves in the fields around can escape his ever-watchful yellow eyes. A saucer-shaped hole in the snow shows where he lay down to rest. But look! With a great bound he left the nest, raced down the stack and away over the field. Something must have frightened him. It could not have been us, for when we feel the tracks they are frozen and stiff, showing that they are many hours old. A false alarm, perhaps, for within a hundred yards he is walking again. Now his trail turns toward a strip of marsh grown over with young poplars and willows. Here the varying hares, the "snowshoe rabbits" of the North, have their feeding grounds, and on their criss-crossing, hardpacked trails it is impossible to follow Reynard's comings and goings. We shall have to cast about and circle the thicket to pick up his trail coming out. At the far side, the thicket runs out into a long, straggling point covered with dead marsh grass and stunted willows, close-cropped by the rabbits.

As we trudge around the point, evidences of wilderness drama unfold. Here, in the torn up snow, a varying hare had come scrambling out of the bushes. The labored bounds; the "snowshoe" footprints with every toe spread wide in terror, tell of a desperate race for life. He had made a mortal misjudgment; had allowed the fox to drive him out into the open. Inside the thicket, on his own hardpacked and familiar trails, he might have escaped; here, bounding for his life in the deep, loose snow, the advantage was all with his enemy. And here, inside the bushes, are the deep claw marks where Reynard came racing along the rabbit path, which runs just within the border. Not yet quite abreast, he was still so close that the hare had no chance to turn back, to regain the thicket and safety. A few rods more and bunny would have reached the tip of the point where, among the tangled grass and fallen brush, lay sanctuary. A few yards, and he would surely have made it. But what is this? The hare's tracks have suddenly vanished. Did the animal gain the bushes with a leap to the side? No, for the snow is unbroken on both sides. Looking closer at the trail, the mystery deepens. Here where he last struck the snow his body had been pushed deep into the yielding stuff as though some great weight had pressed him down. Here, too, on either side of the trail, are five parallel

strokes in the snow as though scraped with giant fingers. What could it have been?

Something stirs beside the trail. We pick it up, and the mystery is solved. A wonderfully soft, fawn-colored feather, barred with beautiful pencillings of brown — the feather of a great horned owl. Twenty feet beyond, we see where the bird had struck the snow again with its heavy burden; risen once more. And now the fox had sprung raging from the thicket to save his prize. Swift though the fox is, he had not been fast enough, or the deep snow hindered him. After two or three futile leaps, he had given up in disgust. His trail quits the bush and leads out straight over the marsh, where the muskrat houses show up like snow-covered hummocks among the cat-tails.

"... a pair of whisky jacks alight on a branch above us."

At the base of one of these the fox scratched a little; on top of another are the deep imprints of his hocks where he sat for long, perhaps pondering over his recent discomfiture. Now something must have occurred to him, for the trail leads away, directly towards the distant field. Where the bush-grown fence corner touches the marsh, he turned aside to dig in a little mound of snow, and here he extracted some prize. Feathers, bones — all that is left of a sharptailed grouse, one that he perhaps had killed weeks ago and buried here against a night when the mice were hidden and nothing was to be caught. His belly full, Reynard scarcely deigned to sniff at the tangled trails of the mice as he once more pushed through the matted weeds under the fence and was off.

The fox has eaten, and now a persistent gnawing under the belt buckle gives point to a thought that has been vaguely presenting itself for some time — it is time for our own lunch. A quarter of a mile away, a grove of scattered scrub oaks offers shelter and fuel, and towards this we make our way.

By a little fire of twigs the tea is made (when does tea ever taste so good as beside the open campfire?), the bread and cheese eaten, and the crumbs scattered. Soon a clear, mournful whistle sounds from back among the trees, two pale gray shapes come floating nearer, and a pair of whisky jacks alight on a branch above us. They are welcome company, these confiding, fearless birds, and it is very pleasant to watch them fly softly back and forth, carefully locating every crumb and storing it in some cache hidden back in the trees.

Idly relaxed against a fallen log, watching the birds and listening drowsily to the soft snap of the dying embers, we are startled when a single ululating yelp breaks the stillness away to the north. A coyote? Perhaps, for only last night when the full moon silvered the ridge beyond the long hay meadow we listened while a pack of coyotes yelped and sang their strange wild chorus. Shall we investigate? It must be soon, for a light, keen wind has begun to blow, and the drifting snow will soon cover their tracks.

Once away from the oak thickets, the wind is sharp, and quartering across it we pick our way through the short willows and clumps of tall grass, arriving at the meadow's edge. A gleam of white shows for an instant among the weeds. A cautious movement, then a scrabble and a rush, and from a clump of dry sweet clover bursts a jackrabbit, sailing off with great, drifting bounds. He had seen us coming, but had squatted low, hoping we would pass by without seeing him. There is the bed he sat in, the snow melted down to the brown earth. The dry grass overhangs it, and the sloping rock beside it gives shelter from the wind.

Scattered here and there one may find other beds of his, some in the open fields, some warm and snugly sheltered for blustery days. Look around. There he sits, far out on the open meadow, watching us. We start ahead and away he goes, lightly bounding, to disappear in the willows.

Now, at last, we are on the ridge, and there are the

"... his yellowish-gray fur blending with the gray twigs around him..."

coyote tracks, following the old cowpath that runs along the height. We follow, and on the very crest find the spot where the coyotes played and yapped last night. Yet can it be? The tracks say there are only three, and last night the listeners to the chorus would have guessed a dozen. But this is the place.

The trail winds down the ridge, and here at the edge of the hay slough is another coyote track crossing it. This new track is tantalizingly fresh, and leads off with such a compelling air of purpose that we are beguiled into following it. The animal has trotted up and along the ridge, where no other animal would see him coming. A sudden stop; a few gingerly steps backward, and the tracks show where he has angled cautiously down the side and up again to sniff at a hole under a willow root. It is a skunk den. Hoarfrost around the hole, and a little steam rising from it, tell that the striped one and his family, rolling fat from their autumn gleanings and curled tightly in their deep soft nest of grass, are blissfully sleeping the winter away.

"He had seen us coming, but had squatted low, hoping we would pass by without seeing him."

The gray freebooter licks his chops at the tantalizing odor and a little trickle of saliva drips on the snow. However, at this game he is no novice. The ground is frozen too hard to dig, and he knows that only warmer weather will bring the skunks out. The frost snapping in the tree trunks gives little promise of that, so, he trots away.

A snow-covered outcropping of rock projects bleakly above the angle of the ridge, and on top of this the coyote has lain down to rest. Not for long, however, for though the snow is firmly pressed down it is not melted. An hour, perhaps, of sleep and then, obeying some inner urge, he has risen and slowly made his way to the edge of the marsh where the runways of the mice are thick among the tangled grasses. Here his tracks go quartering back and forth, and here he has gathered his four feet together and sprung directly at a little tussock of grass. A tiny scrap of brown fur and a drop of frozen blood are mute testimony to his mousing skill, and a silent reminder of the constant, relentless drama recorded by the snow.

Once more the tracks lead away from the marsh, turning towards a stretch of low brush, and now they are very, very fresh. Look! Behind that bush! See those two pointed ears, the yellow eyes, and the black nose below them. Do not move; he is watching us. A moment he stands thus, his yellowish-gray fur blending with the gray twigs around him, his sharp pointed face a curious pattern of brownish-gray and yellow; the wonderful, inscrutable hazel eyes lambent with alert watchfulness. But now where is he? He has simply melted away while we watched him. A flash of gray in the willows, a gray streak over the ridge, and he is gone. We will see him no more today. The sight and smell of man have sent him to other hunting grounds, or, perhaps, to join his fellows of the nocturnal choral society of the wild.

As we stand irresolute, the eerie, resonant "Whoo! Whuh, Whoo!" of a great horned owl drifts from the darkening woods. The sky turns dark and overcast and a few warning flakes of snow come sifting down. It is time to go, and yet we turn again for a last look at the familiar landscape, alluring, mysterious, yet faintly menacing in the gathering dusk. A consciousness comes as of a fleeting sadness, a feeling — half pleasure, half pain — that every naturalist, perhaps, has felt. Tomorrow, it may be, we will take up the trail again, but today is past, vanished forever into the limbo of joys gone by. Another page is turned in the book of Eternity, a new page opens, even as tonight's snowfall covers the trails we followed through the day. There will be new trails, of course; new records of the constant drama of the wild; new mysteries to solve.

The throbbing cry of the owl comes again, imperious, challenging. Resolutely we turn our faces to the east and slowly swing away on the long tramp home.

Atavism

By LEAH BODINE DRAKE

I remember well. . . .
I was a deer
Chased up a hill
And fleet with fear.

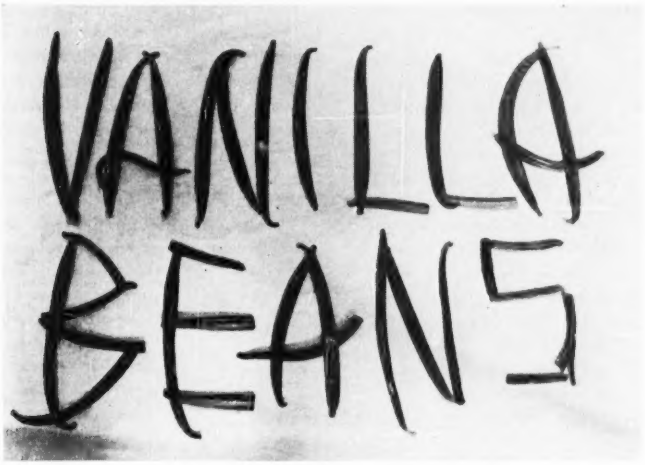
I was a horse
And I felt the crack
Of the heavy lash
On my laden back.

An elephant-king
Of valiant heart,
I died in the ring
For Roman sport.

In an otter's shape
I gnawed me raw
To leave in a trap
My bloody paw.

To the cornered fox,
The baited bear,
The seal on the rocks
With the sealers there,

My blood responds
With a secret cry;
I feel their wounds
And daily die.



By CAROL H. WOODWARD

Title photograph by Ladislaus Cutak

THE orchid that gives us vanilla for flavoring is unique in a family that abounds in idiosyncrasies. Beyond the fact that it is the only orchid cultivated for a commercial product of world-wide use, the plant itself is distinguished on several counts among the 20,000 members of the orchid family.

First of all, it is a vine — and almost no vines are known in the entire family outside the genus *Vanilla*. This is a tropical group of about fifty members, or species, several of which have aromatic pods, and one of which, *Vanilla planifolia*, — the flat-leaved vanilla, which is identical with the species appropriately called *Vanilla fragrans* — is the source of ninety percent of the pure vanilla on the market.

When a wild vanilla plant starts to grow, it takes root in the soil, just as a Virginia creeper or any other vine would do. If it is at the base of a tree, it climbs steadily, clinging to the trunk by its aerial roots until it finds enough sunlight near the top to enable it to flower. Other orchids that have their roots in the ground remain close to the ground all their lives. Those that normally start their life cycle in the trees — as many tropical species do, perching on the branches — get their support and sustenance from their spongy, white, absorptive aerial roots; these have no true roots in the soil at all. But the vanilla is exceptional in that it has both kinds of roots functioning at the same time. It possesses a dual nature, behaving as a terrestrial plant and also as an epiphyte, living chiefly on the atmosphere.

Also among the vanilla orchids are found the only ones with succulent leaves, stems and roots; likewise the only ones having fleshy instead of dry seed-pods.

Even the individual seeds and pollen grains of vanilla are unusual if seen under magnification. The pollen grains, which in all members of the orchid family are held together in a sticky mass, lack the customary connective threads; each grain remains distinct. And it has only recently been discovered in a botanical laboratory that the tiny seed of vanilla, instead of having the usual microscopic, net-like structure around a transparent wall, has a relatively thick, black, opaque wall, the contents of which apparently contribute to the oily, balsamic pulp in which the seeds are embedded. Only two or three other orchids have seeds like this, and one of these (*Selenipedium*), colloquially called by the Spanish name of "vainilla chica," or little vanilla, is used in place of true vanilla in those Latin American countries where it is native.

Although *Vanilla planifolia* is sometimes found wild in Florida and the nearest parts of Central and South America, its principal home is in Mexico, where the industry of gathering and curing the pods was developed in ancient times.

No one will ever know how the early Mexicans discovered the method for treating the bean-like fruits of this orchid, for no aroma develops in the pod until the curing process is well under way. The flowers are fragrant, but not with the odor of vanilla. The earliest written records show that vanilla fruits had an occasional medicinal use, apparently as a stimulant. Perhaps some provident, dark-skinned adobe-dweller, having gathered a large supply of *tlilxochitl* for her man, as a tonic against the languor of the rainy season, kept them longer than usual and, when she finally opened the box, found the flavor to be more worthy of her cooking pot than her medicine vial. But this must have been long, long ago, for Cortes' report of the elaborate social use of vanilla by Montezuma in his fifty jugs of chocolate every day antedates the scanty records of its medicinal applications.

Today, in from the coasts of Mexico, one can still

see villagers cultivating and curing vanilla by the same methods used when white men first touched these shores, four and a half centuries back. The dried, aromatic fruits were in the Spanish trade early in the 1500s, even before the conqueror Cortes landed in Mexico. They were sold under the Spanish name of "vainilla" (meaning a small pod), because the traders could not repeat or spell the Aztec name of *tlilxochitl*.

Vanilla at once became popular in Europe, but as a perfume rather than a flavoring for desserts. Around 1739 it made its first living appearance in the hothouses of an English lord, who had no idea that this was the plant from which vanilla extract was obtained. To him it was an ornamental subject with fragrant flowers. But his stock was apparently lost, and no one hears much more about the plant until 1840, when a French professor, Charles Morren, aware that he had a vine of commercial importance in his greenhouse, became the first on record to produce pods on vanilla by artificial pollination. Up to that time, nowhere outside of the native habitat had fruits developed from vanilla flowers. The reason was the absence of the little, stingless bee named *Melipone*, which seems to live wherever vanilla grows wild, and which succeeds in pollinating the flowers when it dives into the depths of the tube to steal the copious nectar at the base.

With Morren's success came the conviction that vanilla, which, for its weight, has always been one of the highest priced plant commodities, could be grown as a crop in many tropical lands. Cultivation soon was started in the French-controlled islands in the Indian Ocean and in the East Indies. Today about half the world's supply comes from these same islands — principally Réunion (where an excellent quality is produced under the name of Bourbon vanilla), the Seychelles, and others, and also from Tahiti.

Vanilla seeds embedded in the viscid substance of a ripened pod, shown in this New York Botanical Garden picture considerably enlarged.

Mexico is the next most important center for cultivation and export of vanilla. In recent years the little island of Dominica in the British West Indies has been claiming vanilla as the principal source of its modest wealth, and experiments are now going on to develop the culture of disease-resistant hybrids in Puerto Rico. But commercially productive plantations there are still in the future.

A landowner planning to raise vanilla will first clear his ground, if it is forested, of all except trees that are growing about eight feet apart. These he will keep and trim to allow just enough but not too much shade for the vines he will plant. If there are no trees he will drive posts into the earth, for a vanilla vine will not grow unless it can attach itself to a support.

Vanilla is started from cuttings, and from the time a two- or three-foot length of vine is bound to its support with a cord or liana, until a bottle of vanilla extract reaches the housewife's shelf, at least four years must elapse.

Rich soil is generally heaped about the base of the cutting, which eventually will send a pale red, succulent root trailing through the soil; but in some regions, where root rot has been a problem (as in Puerto Rico), the grower depends entirely on the spongy, white, aerial roots. A few of these will grow earthward until they find anchorage in the soil, but most of them will wrap themselves around the tree, to hold the vine in place and absorb moisture and nutrients for it from the saturated tropic atmosphere. Once established and given proper care, a plantation may produce vanilla for thirty or forty years.

A well-grown vanilla vine can be one of the most symmetrically perfect plants in the world. With a scarcely perceptible zig-zag line, the growing tip pushes straight up toward the top of a tree, thrusting out an even-margined leaf — first on one side, then on the other — at precise intervals. The smooth leaves, in which the veins can scarcely be seen, lie flat against the supporting tree trunk and the succulent green stem will not vary its thickness all the way to the top. Although the leaves appear at the same angle on a single vine, they may vary greatly both in position and shape on different plants. In fact, so readily do they respond to surrounding conditions that in Dominica they are used as indicators of the amount of light to be provided for the plants. In too much shade they are long, slender, and dark green; in too much sun they are roundish and yellow. The ideal condition for flowering and pod-production — about two-thirds sunlight to one-third shade — is indicated by a clear green leaf three times as long as wide. Sun and shade can be adjusted by pruning of the support when the vines are grown on living trees.

A vine will commence to establish itself a few months after planting. With good conditions it will thrive and flower during the second year, although it may be another year, at least, before it can properly be classed as a bearing plant.

A vanilla vine has the capacity for growing sixty feet or more into the top of a forest tree, but on a plantation it is necessary to keep the flowers and fruits, which occur near the tip, within reach of the

The pretty, fragrant flower of the vanilla vine is a lemon-yellow orchid. The fragrance, however, bears no resemblance to the odor of vanilla.

PHOTOGRAPH BY LADISLAUS CUTAK

pollinators and harvesters. The supports — trees or posts — are therefore kept low enough so that the vines will flop down after they have reached the top.

Vanilla requires a large amount of rainfall during its growing season, but it will not flower unless the atmosphere is dry. The period of flowering, therefore, varies in different countries. Clusters of twenty buds or more will arise intermittently on short stalks in the angle between the leaf and stem. These develop slowly; perhaps it will be six weeks from the time that the first bit of satiny, yellowish-green emerges until the fragrant, lemon-yellow orchid flower is open.

The blossom lasts less than a day; by early afternoon it is done for. Pollination, therefore, must take place during the morning. Boys and girls, young men and women, are at the vines by sunrise and they work until noon for two or three months while flowering continues. A skillful girl can pollinate a hundred flowers in an hour. The trick of manipulating a tiny wooden paddle the size of a toothpick (or, in some regions, a safety-pin) so that the pollen mass makes contact with the carefully covered stigma of the same flower takes less time than to read these few lines. Cross-pollination is not attempted; it does not seem necessary. But hand pollination is required for pod production in plantations. Even the bee, which pollinates the flowers in the wild in Mexico, does not do a very efficient job. The grower must see that the pollen mass, containing the male element of the flower, is deliberately transferred to the sticky stigma, through which the individual granules, by sending out a long tube, will eventually reach the ovary of the flower, where the actual fertilization will take place.

A month and a half after a flower has been pollinated, the pod will have reached its maximum length, which is slightly longer than the leaves, or about nine inches. But it will be eight to ten months more before the pod is ripe. During this long period, some curious transformations are going on within. Shortly after the ovules have been fertilized, the cells of the innermost layer of the ovary wall begin to extend themselves toward the center of the cavity in the form of unicellular hairs, which are packed with nutritive materials. It is believed that these hairs secrete the substance that eventually gives the vanilla "bean" its flavor.

Meanwhile, the minute ovules themselves have been undergoing changes and becoming, relatively speaking, so enlarged that the entire cavity of the ovary is filled with seeds and "hairs." It is as though a squash, instead of having a netlike structure around the mass of seeds, gave rise to countless little hairlike protrusions on the inner surface of the flesh. All this material on the inside of the vanilla ovary (which becomes the seed-pod, or fruit, technically speaking, after fertilization), is viscous and balsamic when the pod is ripe.

Picking of vanilla starts when the first tinge of yellow is seen at the tip of the long, green fruit. Since the pods on a single vine ripen at different times over about a two-month period, each vine must be inspected every day, once the harvesting is begun. If a pod is left too long, it will split lengthwise into two valves, and will then be of poor quality. Sometimes a fine thread is tied around a pod to hold the valves tightly together.

If the vanilla fruits are picked too soon, on the other hand, the proper flavor can not be developed. Yet many growers allow themselves this folly, to prevent theft of their pods from the vines — a practice which has caused many difficulties among plantation owners. Often a grower will brand each individual pod with his initials, or some other sign. The scratch of a pin will leave an indelible mark on the fruit.

Although some growers cure (Continued on page 499)

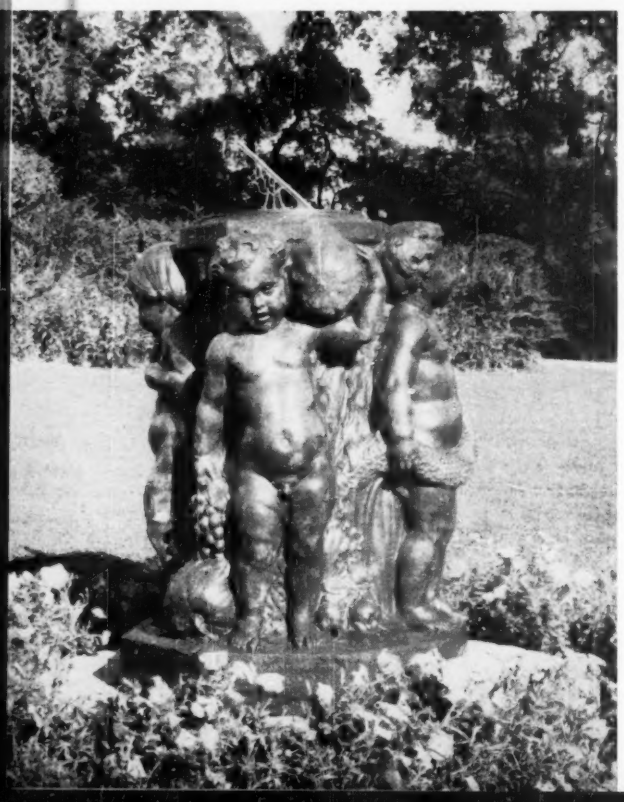
Near to God's Heart

By RICHARD W. WESTWOOD

The kiss of the sun for pardon,
The song of the birds for mirth,—
One is nearer God's heart in the garden
Than anywhere else on earth.

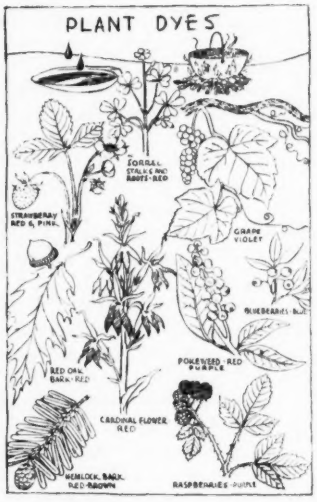
THIS inscription is carved about the edge of a beautiful and hospitable bird bath that stands in the extensive gardens of the late Dr. Lewis Rutherfurd Morris at Manor House, Morris, New York. The verse is from the lovely poem, "The Lord Planted a Garden," by Dorothy Frances Gurney.

The bird bath is the work of Bryant Baker, New York sculptor, whose work is widely known. He did the Stephen Mather Memorial plaque, which is found in every National Park in the country. "The Pioneer Woman," the splendid sculpture at Ponca City, Oklahoma, commemorating the opening of the Cherokee Strip, is also Mr. Baker's work. He has three sculptures in Statuary Hall in the National Capitol, and has done busts of Chief Justices of the United States, White, Taft, and Hughes, and is currently working on the statue of George Washington for the George Washington National Masonic Memorial Association in Alexandria, Virginia.

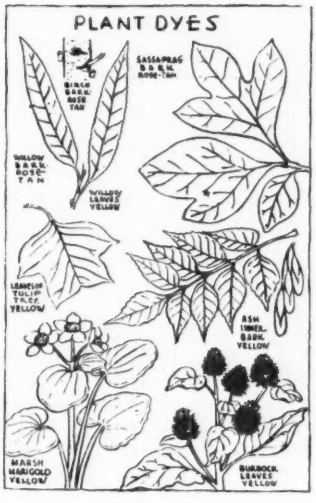


Selection of the birds for this bird bath was made with the help of Roger Tory Peterson, noted ornithologist, artist, and author, who approved the final sculpture model. At the base of the stylized tree are kingfishers and bob whites, expressive of land and water, as well as a common box turtle and a chipmunk. On the column of the bath are song birds, a song sparrow and two titmice being visible in the illustration. Other birds, including the house wren and cedar waxwing, also are represented. The bowl of the bath is carved with a lilypad design to afford avian patrons different depths of water in which to stand.

The Morris estate, with its extensive area of some three thousand acres, was settled under a grant from George II, and has remained in the Morris family ever since. The late Dr. Morris was a direct descendant of Lewis Morris, one of the signers of the Declaration of Independence. He was also a pioneer in reforestation and forest conservation, planting many thousands of trees on the Morris acreage. Much of this forest is now ready for harvest on a sustained yield basis. Also on the property is a lovely church, the Morris Memorial, or All Saints Chapel. Mr. Baker is also the sculptor of a charming sundial that stands as a memorial to Dr. Morris. Both bird bath and sundial stand on old granite millstones collected from disused local mills.



PLANT DYES
BLACK WALNUT HUSKS - LIGHT BROWN
HORSE CHESTNUT HUSKS - RED BROWN
AGRIMONY LEAVES AND STALKS - YELLOW
GOLDENROD FLOWERS - YELLOW DYE
OSAGE ORANGE ROOTS AND BARK - YELLOW
ST JOHNSWORT FLOWERS - YELLOW
ELDERBERRY FRUITS - PURPLE COLOR


PLANT DYES
SASSAFRAS BARK - ROSE TAN
BIRCH BARK - ROSE TAN
WILLOW BARK - ROSE TAN
WILLOW LEAVES - YELLOW
LEAVES OF TULIP TREE - YELLOW
ASH INNER BARK - YELLOW
MARSH MARIGOLD - YELLOW
BURDOCK LEAVES - YELLOW

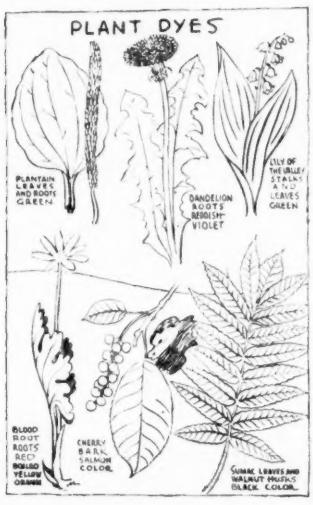
Berry Juices and Plant Dyes

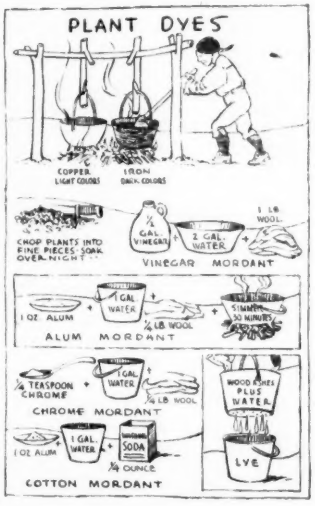
By ELLSWORTH JAEGER

BERRY juices and plant dyes can be used for colors. The juice may be squeezed from the fresh berries into mollusk or clam shell containers, or the berries, fruits, roots, or plants may be boiled until a concentrate of color juice is available. Various juices may be mixed to obtain different colors and the addition of water will determine the shades.

The berries of pokeweed make a deep reddish-purple. Cherries, strawberries, or red raspberries make various shades of red and pink, as do the roots and stalks of sorrel, cardinal flower, red oak and hemlock bark. Black raspberries have a purple dye, and grapes a violet color. A blue color of sorts can be derived from boiled blueberries.

Husks from walnuts, when boiled, create a dark brown, while that of horse chestnuts will make a reddish-brown. Use a quantity of husks and boil down into a dark liquid. Goldenrod flowers, agrimony leaves and stalks, Osage orange roots and bark, St. Johnswort flowers may be boiled into a yellow dye. Elderberry fruits give a purple color. Boiled birch or willow bark, and sassafrass root bark, make a rose tan, while yellow is derived from willow leaves, marsh marigold, ash inner bark, tulip tree leaves, ragweed and burdock. Plantain leaves and roots boil down into a green dye, as do nettle roots, stalks and leaves of lily-of-the-valley. The roots of the dandelion make a reddish-violet. The roots of bloodroot exude a blood-like color when injured, and a yellow-orange dye when boiled. Cherry bark yields a salmon color, while the roots give a blue-violet dye. A black is made from walnut husks and sumac leaves.


PLANT DYES
PLANTAIN LEAVES AND ROOTS GREEN
DANDELION ROOTS REDDISH-VIOLET
LILY OF THE VALLEY STALKS AND LEAVES GREEN
BLOOD ROOT ROOTS RED BOILED YELLOW ORANGE
CHERRY BARK SALMON COLOR
SUMAC LEAVES AND WALNUT HUSKS BLACK COLOR



Making dyes requires that the dye plants be chopped into fine pices, soaked over night and then simmered for an hour or so, after which the dye is strained. In colonial times dyeing was done outdoors. An iron kettle was used for dark colors and a copper kettle was employed for bright colors.

Mordants are often used in dyeing wool to make the dye penetrate the fibers more deeply. Mordants sometimes change the color of the dye and also help to make the dye permanent. Use mordants first and dye later. Pokeweed berry dye becomes rose red if mordanted in vinegar and water (a half gallon of vinegar, two gallons of water to one pound of wool). Alum or chrome (Potassium dichromate) may be used as mordants for wool. For a quarter of a pound of wool, an ounce of alum is mixed in a gallon of water and simmered for thirty minutes, after which the wool is kept in a dark place until dyed. The wool may be left in the mordant over night and then rinsed before dyeing. The chrome mordant formula is a quarter of a teaspoon of chrome to a gallon of water for a quarter of a pound of wool. The wool is treated as in the alum mordant.

Sheep's wool, or a spun yarn, may be dyed in this way, first treating with mordant and then later dipping in the hot dye. Such dyes as walnut, horse chestnut, or alder bark do not require mordants. To mordant cotton, mix an ounce of alum to a gallon of water and a quarter ounce of washing soda. The process is the same as in the wool mordant.

To dye material, rinse it first in water after it has been mordanted. Gently squeeze out the moisture and then immerse it in lukewarm dye and simmer. If the dye boils down, first remove the material and add boiling water from time to time as needed. When the material has been dyed, rinse it in water of the same temperature, gradually cooling and rinsing until the water remains clear of dye. Gently squeeze out moisture and shake material well (do not wring) and dry in the shade.

Lye sometimes brightens colors. Of course this should be a weak solution. Lye can be made from hardwood ashes, such as that of oak or hickory. Punch a number of holes into an old wooden pail and shovel a quantity of wood ashes into it. Hang the pail over another and then pour water over the ashes, the lower container catching the lye solution as it drops through the holes. It is in this way that the pioneers made lye for soap making as well as found it useful in dyeing.

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A Remarkable Beech

By S. GLIDDEN BALDWIN

AFTER reading the article "They Call It A Disease" by Annie J. Talabere in the April, 1949, issue of *Nature Magazine* I was reminded of an American beech tree I photographed last summer. Is this, too, fasciation? Dr. Arthur B. Williams of the Cleveland Museum of Natural History, a well-known naturalist, pointed this tree out to me because of the unusual number of limbs all coming out from the same place on the main trunk. We counted twenty-one limbs and at the time we discussed it we thought the tree had probably lost its leader in early life and these limbs had grown out to replace it. This loss of the main stem could have been caused by a disease or accident.

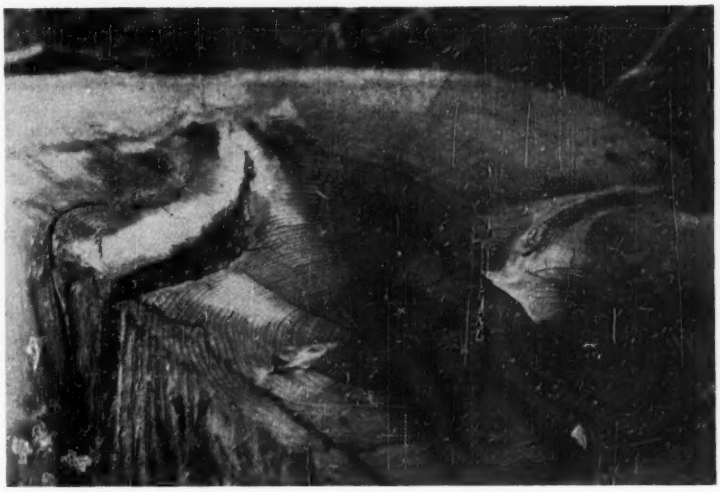
At the present time the tree does have a main stem and is nicely shaped. However, the present leader is of somewhat smaller diameter than the side limbs, which gave us our clue as to the possible destruction of the original leader and this unusual formation. The tree is located in the North Chagrin Metropolitan Park near Cleveland, Ohio.

I have observed the same formation in a Norway spruce on the Thorndale estate near Millbrook, New York, and the owner, Mrs. Oakleigh Thorne told me her husband shot the main stem of this tree off with a twenty-two rifle when he was a boy, some sixty years ago, and that this caused the unusual and abnormal growth of the side limbs. This is not fasciation, of course, but both trees are remarkable and unusual.

When Dr. Baldwin can spare time from his practice as an eye, ear, nose and throat specialist in Danville, Illinois, he roams far and wide seeking record and notable trees. The interesting beech above is such a tree. Dr. Baldwin urges a campaign to save large and record trees, pointing out that once they are gone they are gone for good, since one cannot breed such trees, as with dogs and cats. He feels there should be a humane society for fine trees.

Nature's Diary

By ALICE SPENCER COOK



IN THE early part of the Nineteenth Century, in the area that is now northwestern Wyoming, a small, hard cone from a lodgepole pine slowly opened and dropped its seeds to the ground below. One of the seeds sprouted, took root and grew.

No doubt the tiny seedling often narrowly escaped being eaten or trampled down by grazing animals. At any rate, when it was two years old, one of its tiny shoots was broken off near its slender trunk. For the next twenty years — you can count the annual growth rings in the photograph — the stub of the shoot made a brave effort to survive, but at last the trunk completely surrounded it. Only the wedge-shaped knot, which you can see pointing to the center, with a thin layer of bark on the outer part of the wedge, remained to tell its fate.

In the meantime, the first white man to visit this region, John Colter of the Lewis and Clark Expedition, had come and gone, and Jim Bridger, famous Indian scout, had passed that way with his band of trappers. And now South Pass, soon to become the famous corridor to the Far West, was discovered and the pine tree was twenty-two years old, tall, straight and slender, with thin, gray-brown bark and yellowish-green needles.

The next ten years were dangerous ones for the pine tree. Although it escaped, many of its companions were cut down by the Shoshone Indians for lodge poles for their tepees, which were beginning to dot the valley of Green River, the colorful frontier where trappers, traders and Indians met the pack trains of St. Louis fur companies and exchanged furs for supplies.

Devastating fires that frequently swept through the forest were a constant menace. Note the scar that begins about thirty rings from the center of the trunk? That happened in 1832, when a ground fire swept through the forest. The pine was never able fully to repair the damage and produce a continuous layer of normal wood, for the scar extends all the way out to the periphery.

In 1842, the year that Thomas Fitzpatrick piloted the first wagon train over the Oregon trail, the pine, now forty years old, began to press against a nearby, younger pine. Both trees continued to grow, pressing closer and closer together. Gradually the bark where they touch became thinner and thinner. At last it ceased to form, and the annual growth rings became continuous from one trunk to the other. The two trees were one. Our pine, now sixty years old, was victorious, proved by the fact that there are two distinct centers separated by a crack filled with bark. Later, the annual rings of the older pine encircle both centers.

During this struggle for supremacy, history was in the making. The Mormon emigration and later the "Forty-niners," followed the Oregon trail through Wyoming; the first stage coach passed over this route, followed by the famous Pony Express and the first telegraph line to the Pacific.

Indian hostilities began, followed by the "Bloody Year on the Plains." The Union Pacific Railway pushed rapidly forward across the state. Wyoming was made a territory, and later startled the world by giving women the right to vote, later confirming this right by an equal suffrage clause in the State Constitution.

The annual growth rings of the pine show that, through all these years, there were periods of drought and sometimes there was rainfall in abundance. Scars show that always there was the struggle against insects — bark beetles, wood borers, cone moths, twig weevils and root aphids. But the pine managed to survive.

It was nearing its ninetieth birthday when, on March 30, 1891, in order to protect its timber, the forest in which the pine lived was established by President Harrison as a Forest Reserve, and later as a national forest — the Shoshone National Forest. This was the birth of Forest Service.

The young pine became an old pine as homesteaders streamed into the State, and cowboys drove long-horned cattle from the overstocked ranges of Texas up into Wyoming. It lived through the Cattle and Sheep War of 1892, and finally saw Wyoming become the leading wool-producing state in the Union.

At last, ravaged by the passing of the years and declared a fire menace, it was cut down. It measured eighty feet in height and seventeen inches in diameter. One hundred and thirty annual rings were counted from the nearer center, or pith, of the tree to the outer bark. Not big and not old compared to a California redwood, the tree had attained a ripe old age.

From a cross-section of its trunk, its history has been read as easily as from a printed page — a page from Nature's diary. One hundred and thirty winters of cold and blizzards or softly falling snow. One hundred and thirty summers of scorching winds and drought or soft zephyrs and gentle rains. One hundred and thirty years packed with living!

On Finding a Strange Bird Dining With the Sparrows

By GRACE STILLMAN MINCK

Today a stranger came to dine—
A foreigner, he found our ways
Much to his liking—drew no line
Of custom or tabu—his praise
Included all the neighborhood.
He'd come—he'd seen—he'd found us good.
Birds of another, different, feather,
We found ourselves at last together,
Thanks to the table I prepare
Of crumbs for wing-borne folk to share.

Wisconsin's Second Dovekie

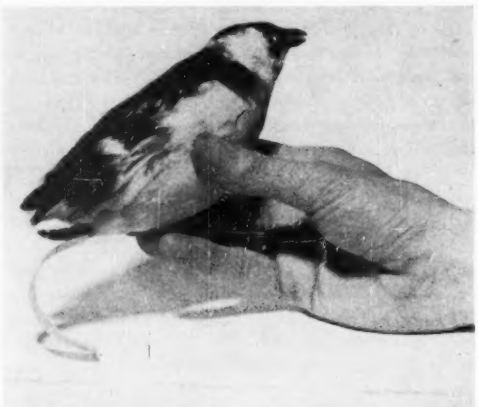
By DOROTHY M. MEAD

On March 3, 1949, Wisconsin's until then lone dovekie record was unexpectedly increased to two by the finding of a new specimen. For slightly more than forty-one years the first dovekie, picked up on the beach at Port Washington on January 11, 1908, had held sole honors for the State. It has long since been in the collection of the Milwaukee Public Museum.

The new specimen was found by an employe of the Tomah Ranger Station of the Wisconsin Conservation Department while brushing a telephone line right-of-way on the west side of U.S. Highway 12, in Monroe County. During the course of his work he came upon the plump, little, black and white bird lying on the snowy ground under the wires. He picked it up, thinking that it had been killed by flying into the wires, and took it back to the ranger station. Nothing could be found in any of the station's books that even remotely resembled the bird. So the specimen was brought to me for identification.

It was the first time I had actually seen a dovekie, and I was thrilled to hold in my hands this smallest of the wintering sea birds from far distant Arctic regions. While they are not uncommon along the Atlantic Coast, the dovekie's appearance inland is a rarity made possible only by storms and gales that force them off their course.

While neither the ranger nor the man who found the bird seemed to realize its importance in the State's bird records, I knew something should be done to preserve the specimen. But I knew of no expert taxidermist to whom so rare a find could be entrusted. Appeal to the Wisconsin Society for Ornithology brought a telegram from the Associate Professor of Zoology of the University of Wisconsin. This bore both congratulations on the new dovekie record and a request that the bird be expressed to the University. This was done immediately.



Prepared study specimen of the second dovekie found in the State of Wisconsin. Discovered in Monroe County in March, 1949, it apparently had died of exhaustion.

During the course of a considerable ensuing correspondence many points came to light. One of the most interesting things about our dovekie specimen was the finding of nothing in the stomach but a little piece of quartz. That definitely proved that the bird had died of exhaustion due to lack of food, not from flying into the wires.

Monroe County is close to the west-central border of Wisconsin, and the dovekie is now a highly prized addition to the University of Wisconsin's collection. It was prepared as a scientific study skin because of its special value as a rare visitor to this region.

Beautiful alpine firs decorated by Nature on the slopes of Mount Rainier, and, left, a Douglas fir serving as an outdoor Christmas tree and on which Nature, also, has supplemented man's decoration.

Christmas Trees

By C. FRANK BROCKMAN

Photographs by the Author

OF ALL the symbols of the Yuletide the Christmas tree is pre-eminent. Young and old enjoy its verdant beauty and its contribution to the festivities of the season. Tinsel and gay decorations enhance the tree's charm. Although the origin of the use of the Christmas tree is lost in antiquity, it has been a seasonal symbol for many generations. Yet, despite its importance, it is rare that the true identity of one's Christmas tree is correctly known. In uncounted American homes it remains anonymous.

Many kinds of native evergreen trees serve at Christmas, for our land is wide, and varied in soil, climate and topography. Although Santa seems as well satisfied with one kind of tree as with another, a friendly knowledge of the tree that graces your home will add a bit more interest to the Yule season.

Foliage of the giant sequoia, or big tree, is scale-like in superficial appearance. Cone and seeds.

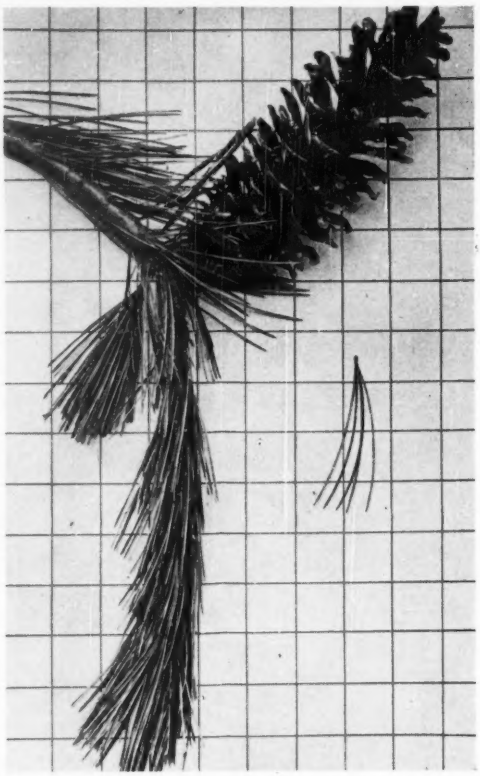
Actually, the principal groups of Christmas trees can be easily identified by the novice. In most cases little more than a casual glance at the foliage is necessary as a start. Roughly, there are two broad classes of yuletide trees — those with scale-like foliage and those whose foliage is needle-like.

Needle-like foliage is found in the evergreens most commonly used for Christmas decoration. The needles may be borne singly on the branches, as with the spruces, the true firs, Douglas fir, the hemlocks, or the redwood. Or the needles may be arranged in "bundles" of two to five, as with the pines.

So let us meet *your* tree! If its needles are in "bundles" it is one of the pines; but if the needles are borne singly on the branches it may be one of the other evergreens. Further investigation is necessary. Grasp a handful of the foliage. If the needles are pointed, stiff, and somewhat prickly to the touch it is a spruce. And, with the single exception of the Sitka spruce, whose foliage is flat in cross section, our native American spruces are characterized by plump to four-sided needles. Such trees are specially suited for Christmas use because they possess a stout, erect central stem that adequately supports any ornament placed at the apex of the dense, compact crown. Spruces are also unique because, when the needles drop or are pulled from the branch, short, woody, peg-like bases remain. So bare spruce twigs have a rough and "warty" appearance.

Six species of spruces are native to North America. Red spruce is found in New England and the Appalachian region, where it is widely favored for Christmas use. White spruce and black spruce occur in New England and in the Lake States, and range northwestward through Canada to Alaska. The Colorado blue spruce has the central Rocky Mountain area as its natural home, but its beauty is so outstanding that it has been cultivated for landscape decoration in many parts of the country. Although rarely cut for indoor use, it is often the highlight of outdoor illuminated Christmas displays. The more common Engelmann spruce is found in the northern Cascade Mountains, as well as throughout the Rocky Mountain region from British Columbia south, at progressively higher elevations, into Arizona and New Mexico. The Sitka spruce, rarely used for Christmas decoration, is

Pines have their foliage in "bundles" of two to five needles per "bundle." This is the western white pine, which has five needles per "bundle."

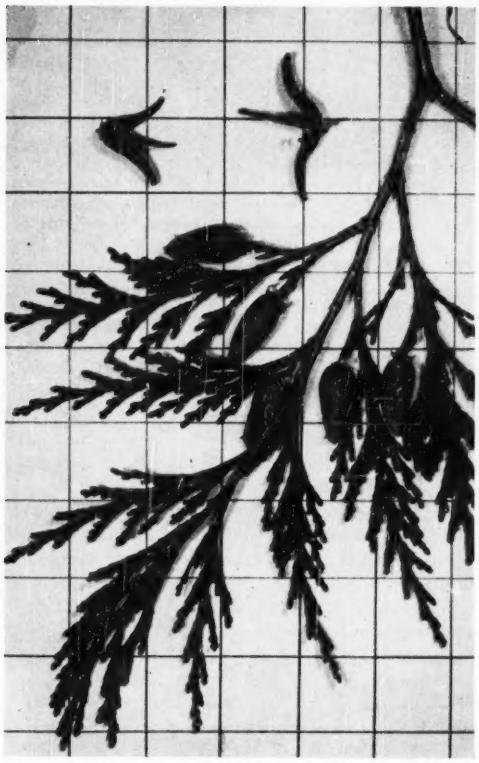


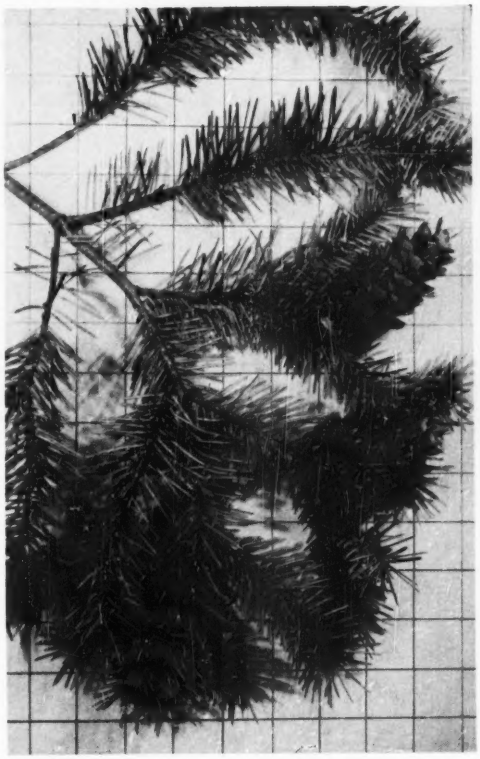
an important timber tree that occurs along the Pacific Coast from Alaska to northern California.

Just as the needles of the spruces are stiff, generally four-sided, and prickly to the touch, those of the redwood, the true firs, Douglas fir, and the hemlocks are soft and flat. While all members of those groups have this character in common, their needles differ quite radically from one another in other important respects. Redwood needles, for instance, are tipped with a slender point instead of being blunt. Redwood needles also partially clasp the stem at the base, and a sharp twist at that point serves to arrange them in a flat, two-ranked pattern. This tree is rarely used as a Christmas tree, however, except in certain parts of its native California. In that state it occurs in a narrow coastal belt along the Pacific, from a point just north of the Oregon line to the southern extent of its natural range just south of San Francisco.

The true firs, and there are eight species native to North America, also possess a distinctive feature by which they may be quickly recognized. When the needles drop from the branch, or when they are pulled off, a characteristic and conspicuous round leaf scar remains upon the twig. Careful examination of the foliage of the true firs will indicate the reason for this. True fir needles are not narrowed at the base. Instead they appear somewhat like a small suction cup at that point, and when the needle is removed the round leaf scar remains as an indication of its former point of attachment. True fir needles are also blunt or notched at the tip.

Like this incense cedar, the foliage of all our native trees called "cedar" is scale-like. Note the cones. All these pictures are photographed against inch-square backgrounds for comparison of size.

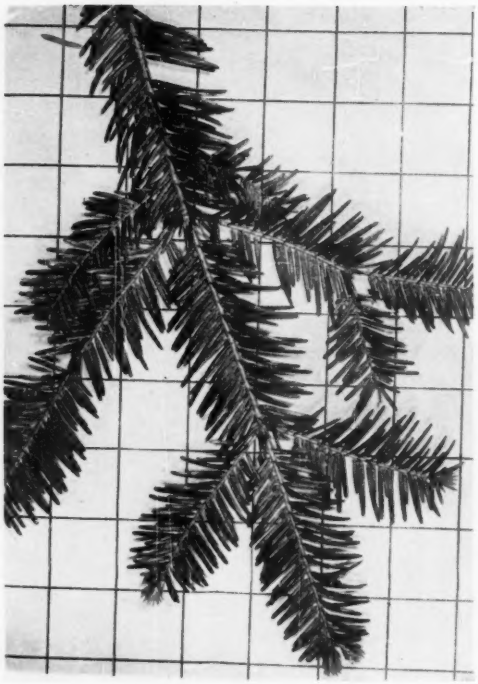


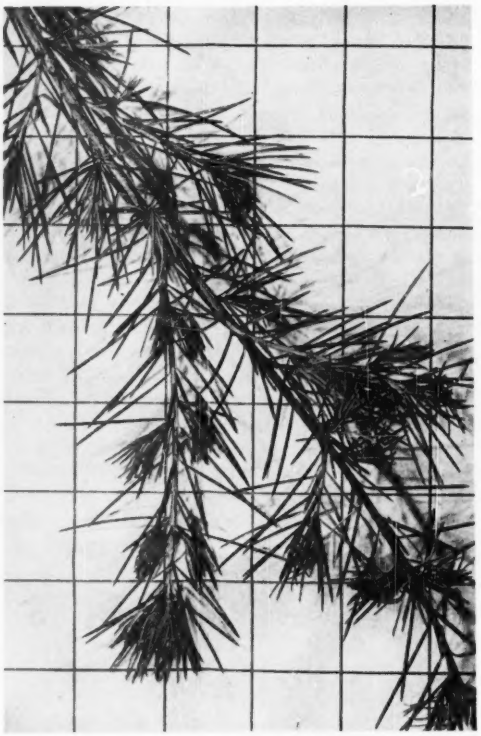


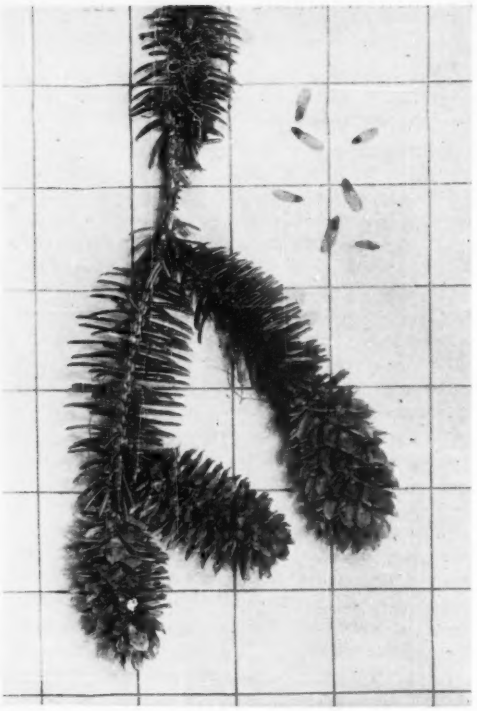
Douglas fir foliage is flat, blunt-pointed, soft to the touch, and it grows in all directions from the branch. Characteristic cones are shown.

True firs serve admirably for Christmas trees, for the crown is dense and compact and the central stem is stiff and erect.

With the exception of the well-known balsam fir of the northeast and Appalachian forests, and the rather rare Fraser fir of the southern Appalachians, all native true firs are western trees. These include the beautiful, spire-like alpine fir of the northwest and Rocky Mountain region; the white fir, native to the Rocky Mountains and large parts of Oregon and California; the grand, Pacific silver, and noble firs of the Northwest; the red fir, which is a common tree in many parts of Oregon and California. Of these the balsam fir of the East, and the white, grand, Pacific silver, and red fir of the West, are most generally used as Christmas







Upper left is the foliage of the grand fir. The needles of the true firs are flat and soft to the touch, and leave a characteristic round leaf scar when removed from the branch. Above is the foliage of the beautiful deodar cedar, a true cedar, and, left, we have a twig and cones of spruce. Its needles are stiff and prickly, are borne singly and grow from a short, woody base. Note the warty appearance of the bit of denuded branch.

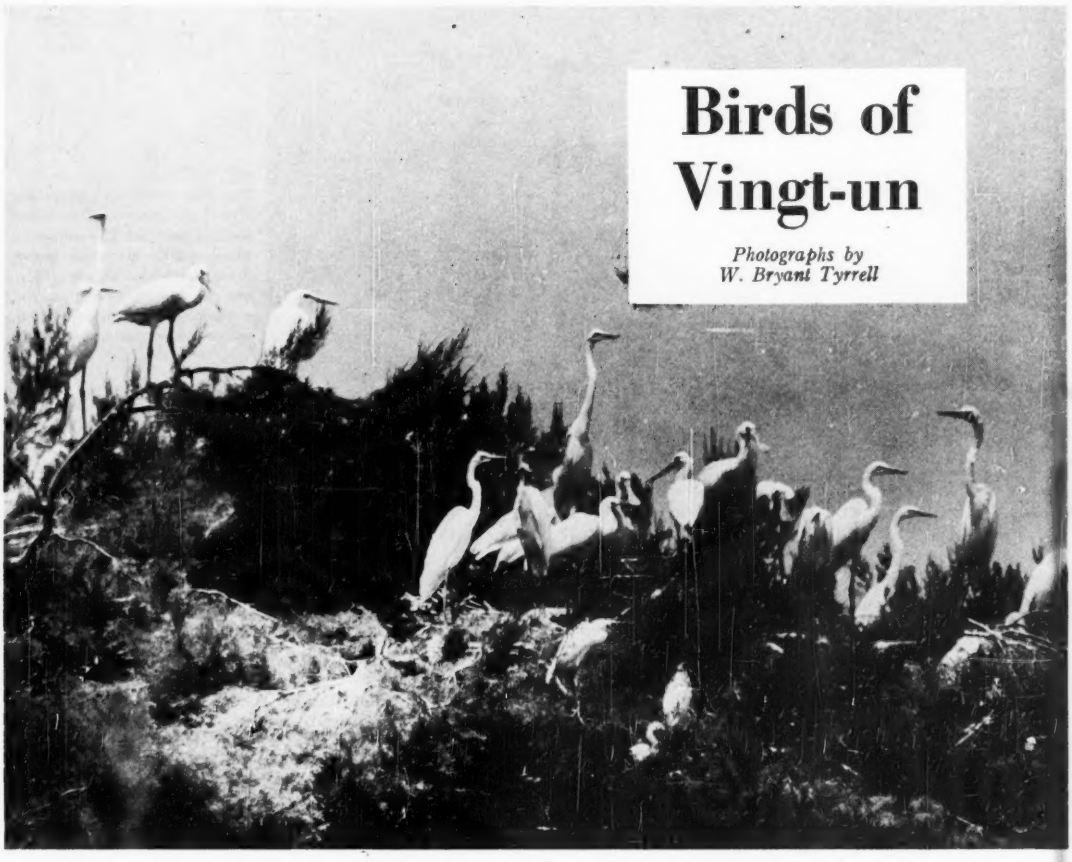
trees.

The needles of the Douglas fir and the hemlocks differ from those of the true firs in that they are conspicuously narrowed at the base into short, slender stems. Consequently no conspicuous round leaf scar remains on the branch when the foliage drops off. Although the Douglas fir and the hemlock are alike in this respect, there should be little difficulty in recognizing one from the other.

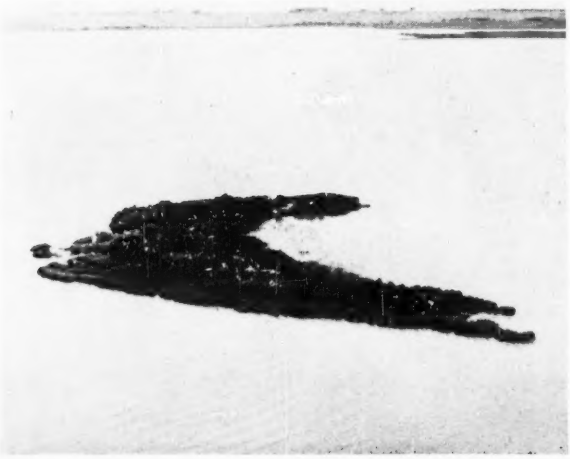
Douglas fir needles are one to one and one-half inches long, blunt-tipped, and extend in all directions from the branch. In addition, the central leader of the Douglas fir, although slender, is erect and sufficiently firm to permit the attachment of a fairly heavy ornament at the top. On the other hand the needles of the hemlocks grow from small, woody "cushions," which persist upon the branches after the needles drop off. Also, the needles are rarely, if ever, more than one inch long, are rounded at the tip, and are variable in length. This latter (Continued on page 503).

Birds of Vingt-un

Photographs by
W. Bryant Tyrrell



A mixed company of roseate spoonbills, and American and snowy egrets roost in the bushes in which they were reared. On the tops of the salt cedars that cover the island the birds develop their wing muscles while balancing themselves on the small branches, and, in a week or ten days, are able to fly, although they continue to congregate on the tops of the bushes. Below is Bird or Crescent Island, the smaller of the two islands of the Vingt-un group that are occupied by nesting roseate spoonbills and by other birds that enjoy complete protection when nesting.

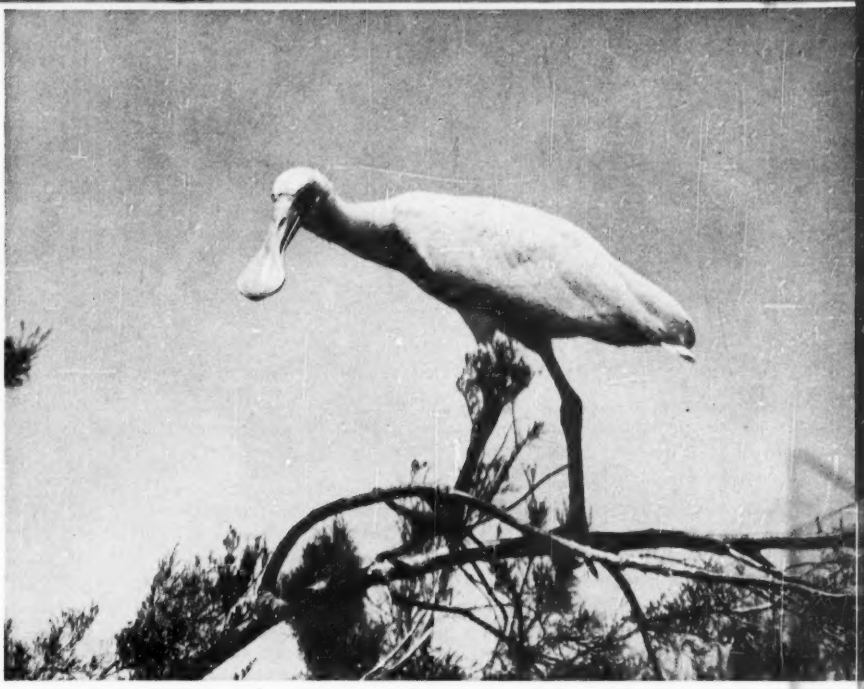


VINGT-UN Islands is the name given to a group of five low-lying islands on the eastern side of Galveston Bay, off Smith Point, Texas. There is a considerable discrepancy between five and the twenty-one indicated by the name. Some say there were once as many as twenty-one islands, which does not seem likely. Others credit the name to pirates who once used the islands and there enjoyed playing the card game of vingt-et-un. The latter version is more romantic and entertaining, whatever its source.

Only two of the islands support enough vegetation to serve birds. The outer island is Bird, or Crescent Island, remotely suggesting a crescent in shape. The largest and westernmost island is Vingt-un, about a quarter-mile long and three hundred yards wide at its widest point. On this island nest most of the thousands of birds, the greater number of which are snow and American egrets, roseate spoonbills, white and glossy ibis, Louisiana herons, a few black-crowned night herons, about twenty pairs of Ward's herons, and two pairs of Florida gallinules. The number of spoonbills raising their families here make this the largest colony of these beautiful and striking birds in the United States. During the nesting season the National Audubon Society supplies warden service to protect them.

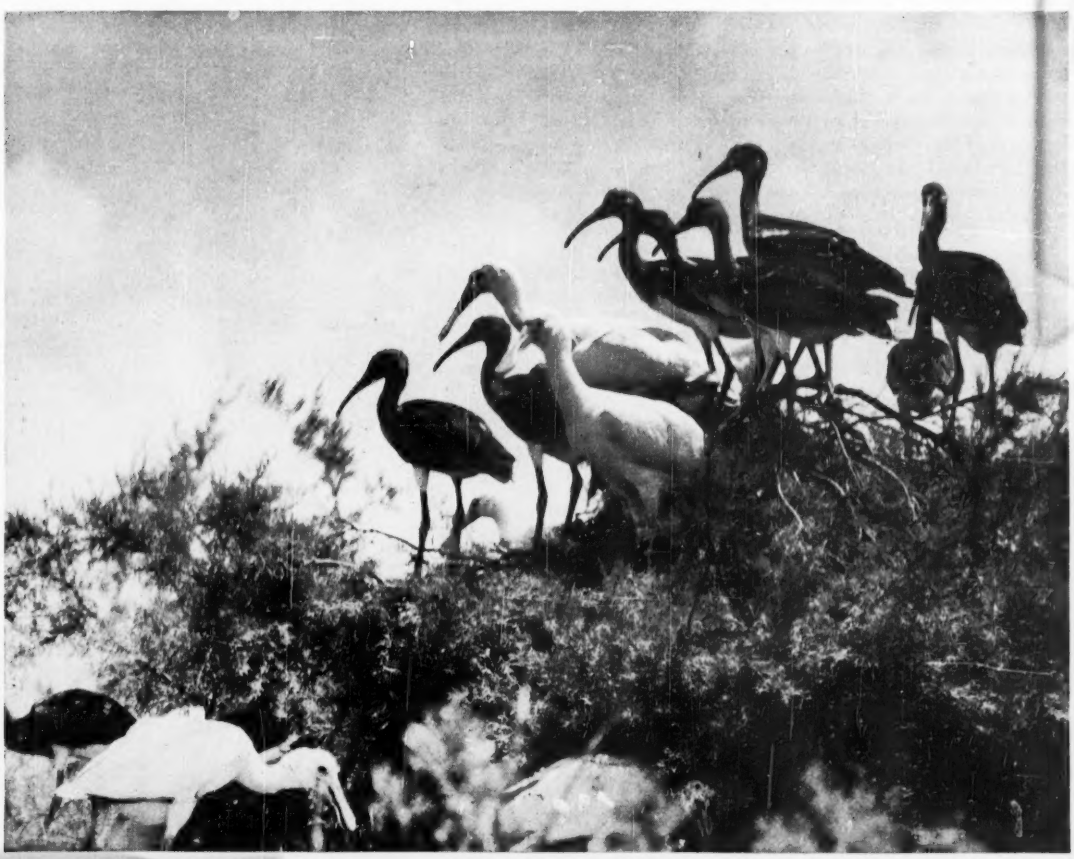
An adult white ibis surveys the scene from its perch. These birds live equably on the Vingt-un Islands with the spoonbills, glossy ibises, Louisiana herons, a few black-crowned night herons and some smaller birds, including boat-tailed crackles and red-winged blackbirds.

Below, a group of young white ibises flush from the bushes on the island, making attractive flight patterns as they try their young wings. The two islands on which the birds rear their young are owned by the State of Texas, but, during the nesting season, are watched over by Audubon wardens, whose duty it is to be sure that nobody lands on the islands and thus disturbs the birds in the important business of raising families.



Young roseate spoonbill. The young birds are a light pink and sometimes almost white. This is in contrast with the bright pink of the adult birds, who also have a bright red patch on the shoulder and a partly naked head. Spoonbills were once common along the Gulf coast from Florida to southern Mexico.

A compact little group of young roseate spoonbills and white ibises before any of them were able to try their wings. The young spoonbills are well fed by attentive parents, one of which is close to the nest, or on it, most of the time while the other parent is in search of food. In about four weeks the young are nearly feathered and ready to scramble to the tops of the salt cedars and join the young white ibises.

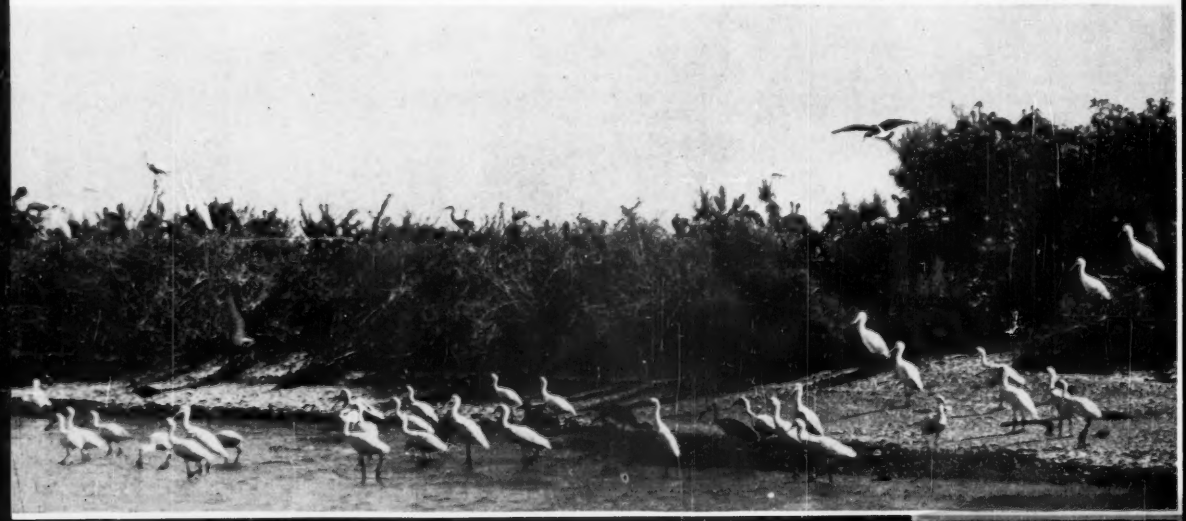


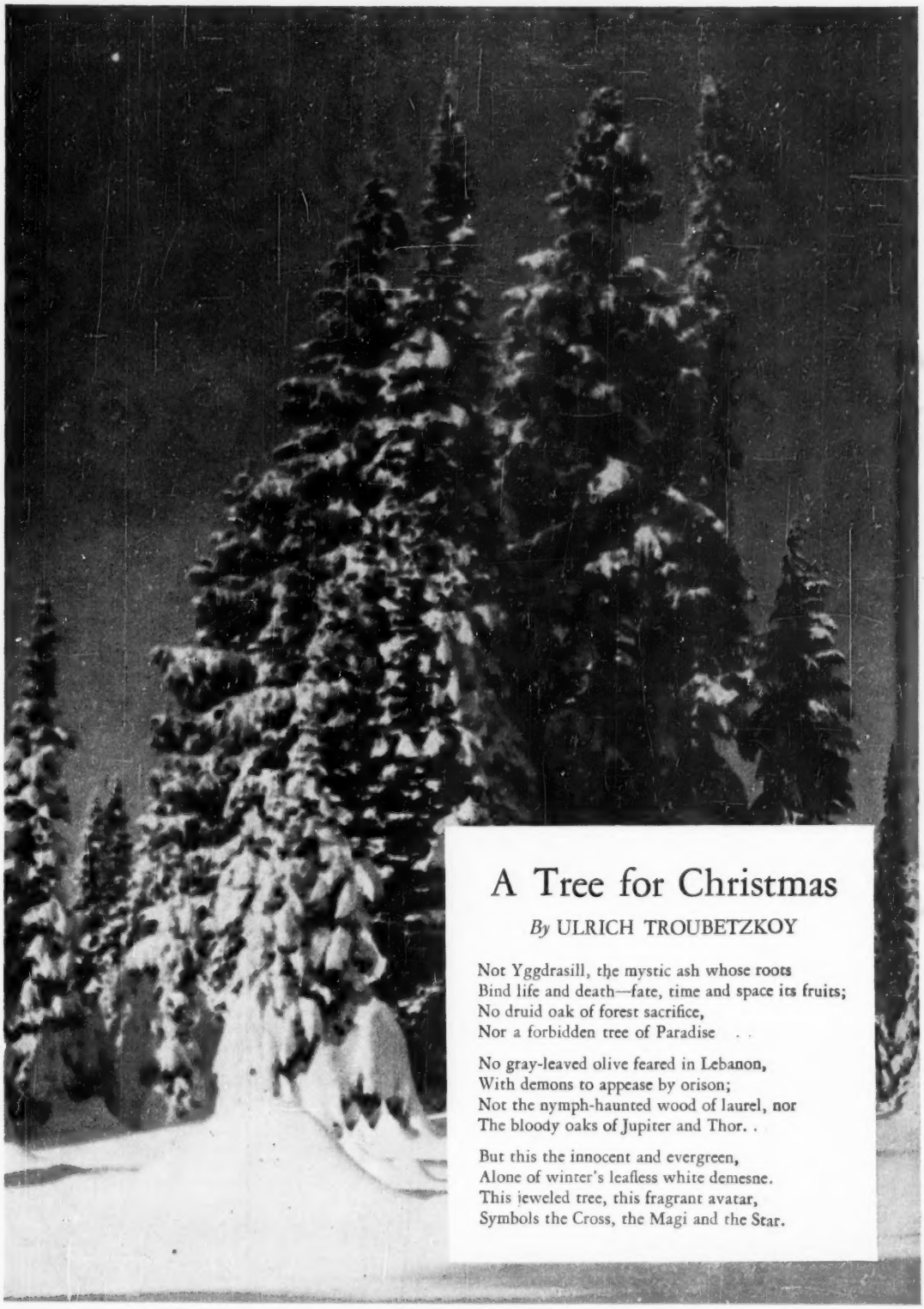
Young roseate spoonbills are most numerous in this lineup of birds on the east point of Vingt-un Island, although the company includes one or two adult spoonbills, some young white ibises and a few American egrets.

ONE hundred years ago the striking roseate spoonbills were common along the Gulf of Mexico, from Florida to the southern border of Mexico. They nested in the trackless swamps and on the coastal islands. Then came a fashion fad that demanded the feathers of the birds for women's hats and for the manufacture of feather fans. The slaughter of the birds was tremendous, and they were nearly wiped out. Indeed, as recently as 1917 it was thought that the roseate spoonbill was gone forever from its native haunts. Then a few pairs were seen nesting on the Vingt-un Islands, and they have continuously nested there ever since, gradually increasing in numbers. Colonies have also been reestablished in Florida under rigid protection.

A bird related to the ibises, the roseate spoonbill derives its common name from its rosy plumage and its odd, spoon-shaped bill. The birds are wanderers, migrating south in winter into Mexico and Central and South America. They usually do not return to the Vingt-un Islands until April, although now and then a few are seen in March. By May they are courting and pairing off, then building their substantial nests in the shaded depths of the salt cedars. The female does most of the construction work, but the male helpfully brings material. From three to five eggs, about twice the size of hen's eggs, are laid. These are a dull buff or cream, speckled or blotched with various shades of brown. By the first of August most of the spoonbills have left their island for winter.

Young white ibises and roseate spoonbills feeding along the edge of the water, with young of American egrets, white ibises and Louisiana herons in the bushes. At the right is the naturalist-photographer, W. Bryant Tyrrell, who took these pictures. The shoulder patch that he wears is the insignia of the Audubon warden.





A Tree for Christmas

By ULRICH TROUBETZKOY

Not Yggdrasill, the mystic ash whose roots
Bind life and death—fate, time and space its fruits;
No druid oak of forest sacrifice,
Nor a forbidden tree of Paradise . .

No gray-leaved olive feared in Lebanon,
With demons to appease by orison;
Not the nymph-haunted wood of laurel, nor
The bloody oaks of Jupiter and Thor. .

But this the innocent and evergreen,
Alone of winter's leafless white demesne.
This jeweled tree, this fragrant avatar,
Symbols the Cross, the Magi and the Star.

Forests as A Sideline

By INEZ HALE McDUFF

Photographs by J. R. Scott

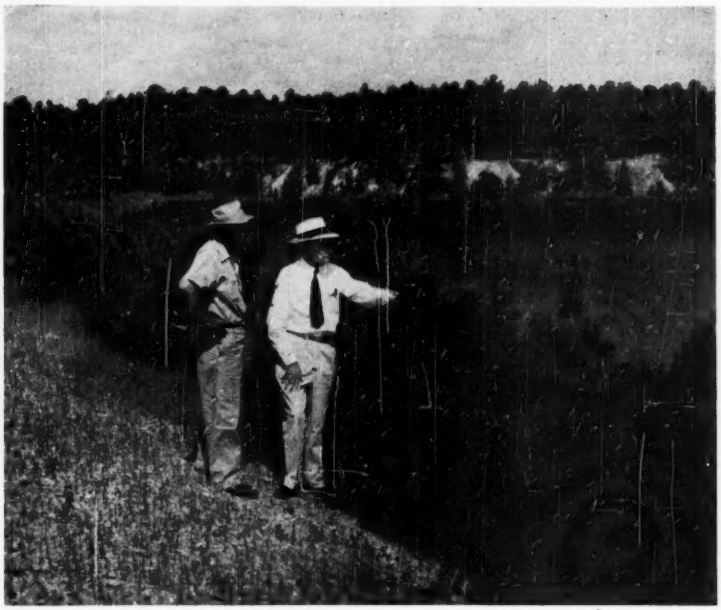
★

BECAUSE a tree is almost sacred to Nebraska-born Luther R. Branting, general superintendent of the Aluminum Company of America's bauxite mines in central Arkansas, the high-flung, man-made hills of the company's mining properties are no longer merely "spoil dumps," but growing forests. There, where barren pits and waste banks once marked the site of extensive explorations for the ore that yields the strategic basic material for aluminum, a brand new crop is rising to return income and to reclaim land for generations to come. The oldest bauxite mining firm in Arkansas, also the largest in North America, has begun to raise trees as a sideline.

Bauxite mining in Arkansas is largely a "strip" process. As the top layers of earth, clay, lignite and other deposits are removed from the bauxite usually lying at a depth of thirty-five to forty feet, great heaps of the material are built up by the steam shovels. The lignite, which is usually the third or fourth layer, and is piled up last, is first of the materials to be exposed to the elements. It must burn itself out, or be drained away by erosion, before the underlying soil will sustain plant growth. The length of time required to make the earth productive again may vary from two to five years, but proof that it will in time grow merchantable timber is found in the old "dumps" of World War I, which are now covered with trees a foot or more in diameter, plus normal forest undergrowth. These trees were from seeds planted by the birds and the elements, and nurtured by the slow processes of Nature.

In the frantic haste of producers to locate and recover ore needed to make aluminum during World War II, the entire bauxite-producing area was pocked and scarred. Today these eroded slopes, like the adjoining older earth-

The young pine seedlings in the picture at the top of the page march across an earthen dam on one of the aluminum company's lakes. The trees in the foreground, now mature, were planted on "spoil dumps" after World War I. At the left is one of many similar spots on the 6000-acre property of the Aluminum Company of America in central Arkansas. Young pine forests are being planted on the high-flung "spoil dumps" of earth, clay and lignite removed during the strip mining of bauxite ore. The large trees are of World War I vintage.



A. O. Harper, in charge of reforestation, and Luther R. Branting, general superintendent of the central Arkansas Alcoa operation, inspect a planting of pines.

heaps, are greening under a new cover as marching rows of sturdy young pine trees take firm hold of the dual-colored soil.

The "dangerous age" for a young pine tree is the three-inch-high stage. Planted in ten-foot rows eight feet apart, the young pines grow little the first year. Loss runs as high as forty percent on "spoil dumps" in that strategic first twelve months. Then the roots take hold, the young tree withstands drought and low nutrition in its second year, and tomorrow's pine trees are in the making. Nature will do the rest.

This is not the beginning of the Alcoa conservation plan, however, but merely one of its more spectacular manifestations. Alcoa officials, who boast that not one foot of their property's magnificent timber cover has been destroyed wantonly or carelessly, have quietly conducted their own reforestation program since 1939. In that year the Arkansas Forestry Division began to make seedlings available for large-scale planting. Since that time the company has set out thousands of young pine trees on "spoil banks" or waste dumps, along roads and in abandoned fields. Between November, 1948, and February, 1949, one hundred thousand young trees were planted. In all, several hundred thousand pine seedlings have been planted in this one program, which was virtually suspended during the most active war years for lack of time or labor. In about fifteen years, the first plantings of this vast crop will be ready to thin and convert to merchantable timber for sale or use on the company's holdings. Today's spoil banks are tomorrow's timberlands in this mine operator's books.

The pine seedling order for 1949-1950, which was placed months in advance of delivery because of the heavy demand on seedling nurseries of the State Forestry Division, will total two hundred thousand young trees to be set out during the winter.

Even before Mr. Branting came to the company's Arkansas bauxite properties in 1920, and took charge in 1924, the company was already in the timber-growing business as a matter of convenience and economy. Much construction work and fencing had to be done when the Pittsburgh Reduction Company

Many acres of Alcoa property are kept in timber and managed on a scientific forestry basis for continued yield. Fire lanes protect tracts of mature trees.

bought six thousand acres for bauxite mining in 1899, and most of the later plant and housing construction was carried on through the years with lumber milled from company-owned lands. One of the first installations in 1901 was a sawmill, which for more than thirty years cut commercial timber needed for the company's use.

About two-thirds of the company's six thousand acres are growing pine timber today. Mature commercial trees are harvested, younger trees are removed if the stands are too thick, and "mongrel" dwarfed or crooked trees are cut or girdled. Pulpwood cutters then come into the area and get all parts of tops they can use.

In the early 1930's the company had an extensive program of thinning the woods for improvement by removal of worthless trees. The program was necessarily abandoned during the war years, but "betterment thinning" has now been resumed as a routine practice.

The company retains the services of a professional forester in private practice in nearby Little Rock for its overall forestry plan. The company's lands are under fire protection of the State Forestry Division, but protection does not end there. Twelve-foot fire lanes are cut, with lateral connecting roads and lanes to enable fire fighters to deflect woods fires.

A. O. Harper, foreman in charge of exploration and drilling for the company at Bauxite since 1919, was placed in charge of the forestry program when exploration ended in 1946, on conclusion of the government's emergency need for ore.

In addition to its pine plantings, the company has set out tulip-trees, elms, maples, and oaks on the streets of the town of Bauxite since 1920. Pleasant tree-shaded vistas among its homes, public buildings and streets have been the reward. Black locust seedlings for fenceposts and mine timbers also were planted on dumps and along fences and ditches in the 1920's. In 1940 these were augmented by 3000 black walnut seedlings, and in 1947 more than 500 pecan trees were set out in the town.

The scarred and broken earth that follows extensive strip mining operations need be no cause for regret by Arkansas conservationists. In twenty to thirty years it will support forest regularly yielding high-grade timber.

At the top of the page are young planted pines, now in the three-inch stage and victorious over the rather inhospitable soil. At the right Mr. Branting inspects a stand of mature timber on a World War I spoil dump.

As We See It

•

Shoot It!!

"THE other day I was riding along a country road with my four year old son when we passed a Hawk perched upon a telephone pole. The little fellow spotted the bird and immediately yelled, 'shoot it.'

"The urge to kill and to destroy still burns fiercely in the breast of modern man. The first thing a young boy wants to do when he gets his air-rifle from under the Christmas Tree is to shoot something with it. Is he satisfied to punch holes in a target or knock a tin can off of a fence post? He is not. He wants to shoot a bird or an animal. He wants to kill.

"I think we all realize that we have 'killed' too much, far too much, during the past century. When the true naturalist stops and thinks of the thousands and thousands of fine game animals and birds that have been slaughtered to the point of extinction, it sort of makes him sick inside. It makes him lose faith with his neighbor.

"We consider ourselves completely 'civilized.' We think of the Indian and the African Natives as 'Savages,' sometimes it appears to me as though the pot is calling the kettle black."

We quote this in its entirety from *South Dakota Conservation Digest*, the official monthly of the South Dakota Department of Game, Fish and Parks. Although the statement is unsigned, it is apparently the sentiment of the editor of the publication, E. R. Lamster, who, as "Duke" Lamster, conducts a department on arms and ammunition and the techniques of shooting in each issue of the *Digest*.

We certainly find ourselves in hearty agreement with Mr. Lamster with regard to his convictions that we have killed too much; that our supposed civilization and superiority over more primitive peoples are, at least so far as killing wildlife is concerned, fictional and smug.

We are, however, unable to agree with Mr. Lamster's apparent assumption that his four-year-old youngster was born with a burning desire to kill and destroy. Nor is there, instinctive in the boy whose parents or fond relatives unwisely present him with a Christmas air rifle, a desire to kill. We would venture to say that young Mr. Lamster acquired his wish to see the hawk shot without straying far from the Lamster fireside; that the idea came either from his father, or from his associates, old or young. We are certain, of course, that Mr. Lamster is a restrained sportsman, but it is quite easy to make remarks that stick solidly in the child's mind, or to allow such remarks to be made, uncorrected in the youngster's presence. Thus is the desire to kill and destroy given to a boy or girl. It is passed on to them by adults. It is *not* innate. The remedy is obvious. An interest in the birds and mammals; an understanding of their lives; a knowledge of their value to man; an appreciation of their beauty as a part of life — all these can be given early to the young. If they are, they will guide attitudes in youth and manhood.

And while we are in a quoting mood, taking advantage of the words of men who have been intimately associated with hunting and see the situation as it is, we wish to quote from *Virginia Wildlife*, official publication of the Virginia Commission of Game and Inland Fisheries. These are the words of M.D. Hart, long connected with Old Dominion wildlife affairs. Under the title of "Gun Pressure," he writes:

"There is a school of thought that seems to contend that gun pressure has been exaggerated in its effect on wildlife and that other factors more detrimental than the gun are responsible for today's plight of game.

"As a hunter and an observer for over sixty years and as one having had the opportunity to see the changing conditions year by year, I cannot subscribe to this theory. To my way of thinking, gun pressure has been the devastating factor that has helped bring the wildlife of this nation to its present low level. Nowhere on earth where man has put his feet has he not drawn too heavily on the wildlife about him. Almost no land today is inaccessible to the modern hunter. Where he cannot reach far-away places by land transportation he can take to the air and be there in less time. Africa and Alaska are only a few examples. Here the governments of these areas have been forced to enact stringent legislation to keep the hunter from killing out the big game in the name of sport or big trophy hunting.

"Man up until now has found no way to control the vicissitudes of the weather, he cannot hamper modern development, agricultural improvement, for he must live — but he can control his exploitation of certain natural resources, if not all of them. Wildlife is one natural resource — renewable and replenishable — over which he can and does exercise some measure of control. I believe that gun pressure is a big controlling factor in the wildlife picture, and as the numbers of hunters increase and the gun pressure rises it becomes all the more necessary that its detrimental effects be curbed."

Olaus Murie studies a map for a field day on Kapiti Island, bird sanctuary near Wellington, New Zealand. W.A. Lindsay, resident caretaker, contributes his opinion, while Donald Murie looks on expectantly. Dr. Murie, naturalist and conservationist, spent six months in New Zealand studying its conservation problems and advising, from the background of his broad experience.

Coming Home

By OLAUS J. MURIE

Our plane rose from the airfield at Auckland and, after the preliminary turns to get on its course, took out over the blue waters of the Pacific. We looked down on the red rooftops and the green land of New Zealand. We saw the shoreline recede as the plane sped on toward the far horizon, over which lay Fiji, Hawaii, and America. Presently we saw no land at all and had the feeling of being simply suspended in space. We settled back in our seats to contemplate our recent experience.

Uppermost in our minds were the good friends, who, only a few minutes ago, back there on the now invisible land, had stood at the airport and waved us goodby. Hospitable New Zealand! For six months we had sojourned there, had visited the national parks, had taken part in the Seventh Pacific Science Congress to which New Zealand had been host. And, particularly, we had taken part in the New Zealand-American Fiordland Expedition, in the roughest, wildest part of New Zealand. It would take time fully to comprehend all that we had seen and enjoyed.

The motors droned smoothly as the plane moved on toward the Equator, and we let our minds dreamily roam ahead over the curvature of the earth; into the Northern Hemisphere; to Home. Then the attractive stewardess came down the aisle with an armful of magazines.

"Would you like something to read?"

I glanced at her collection: *Life, Ladies Home Journal, Saturday Evening Post,* and many others. Then I spied the blue and tan cover of *Nature Magazine* for June-July. "Yes, thanks, I would like this one."

It was the first copy I had seen for many months. What had been going on up there in America? How would it seem to me, fresh from New Zealand rain forests, snowy peaks, strange birds, and a gracious people?

I turned the page to "Nature in Print." What had Zahnie written about this time?

"Riding across the continent in a stainless steel streamliner, feeling the vast expanse of the prairies, the grandeur and magnificence of snowy mountains and at the same time admiring the skill, the neatness, and precision of the engineers. . . ."

I raised my eyes from the page and looked up to the door at the head of the aisle. In the mysterious space beyond that door someone had the knowledge and skill to keep this ship suspended high above the sea, to find the little dot of an island up ahead for the first landing. I looked out through the "port hole," or whatever they call it on a plane, and saw the whirring discs of the propellers glistening in the sun, and I thought of hummingbird wings. Far below us was the mantle of clouds, with blue water showing through here and there.

Yes, Zahnie: "In both book and train [and plane] we are so neatly contained, and we travel through such vastnesses."

And what book is it this time? *The Old House at Coate and Other Unpublished Essays* by Richard Jefferies. As I read on, I seize upon the following quotation:

"I hope something of the forest feeling — the spirit of the forest — will survive in everyone. . .If ever it

Grace Lindsay, daughter of the Kapiti sanctuary caretaker, holds a busy little blue penguin as a subject for Dr. Murie's camera, This bird is the smallest of seventeen species of penguins found in the southern hemisphere. It is a native of Australia and New Zealand.

should happen that our forests and hills should be cultivated, and every trace of wildness smoothed out of the country, do you know, I verily believe it would become necessary to plant forests and lay down hills with turf: in short, to *make* national preserves."

I put down the magazine and look out at the shiny blue, where the propellers are whirring dutifully and comfortingly. Far below, the endless sea of clouds. My thoughts inevitably go back to New Zealand. Most of the native forests have been cleared off. But not all. There is lovely Lake Waikaremoana, surrounded by native bush that clothes the rolling hills in all directions — a satisfying wildness to which the rata, rimu, tree fern, and a host of other trees, ferns, vines, mosses, and flowering plants contribute to form a world in which man can find in full measure what Jefferies values so highly. And Waikaremoana *is* a reserve. The New Zealand Government has seen to that. Not only that, but Kapiti Island, and some other islands, on which the original forest growth has been destroyed, are also reserves, for the very purpose Jefferies advocates — "to plant forests and lay down hills with turf; in short, to *make* national preserves."

In other words, Kapiti and the others have been made national reserves to allow the forest growth to recover naturally, thus permitting the native birds to flourish once again, and wildness to come again into its own. The most significant and encouraging thought in this is that people of New Zealand have taken this action *before* "every trace of wildness" was "smoothed out of the country."

I remember some accounts in the New Zealand press relating how England is now searching her little island for suitable areas that can be made national parks or Nature reserves. England, food rationed, living under the most austere conditions we can imagine for a civilized nation, having just emerged from the "blood, sweat, and tears" of the most devastating war, setting about to see if she can find some national parks!

Here is something for our Congress to note. Here is something for the international conferences to consider. Here is something for those to take note of who gather in conclave to consider the conservation of "renewable natural resources." Can we separate from each other the concepts of food for the stomach and nourishment for the mind? I recall the meetings I have attended, where the issue was a proposal to build huge dams to produce power, to irrigate more land, to rip and tear the earth's crust in order to produce more and more of what we already have. I have listened to soothing assurances from those who would hush down the warnings about soil erosion. "Science will find a way. We may be able to produce synthetic foods. Anything is possible."

Yes, there is much truth there. Science has also produced this shiny, streamlined plane that is now carrying us over the Pacific, 9000 feet above the water and at a rate of speed that is hard to comprehend; carrying us in such comfort that we passengers can sit here and sip pineapple juice and read our favorite magazines. And I will not deny the inspiration for me in this journey. On the southward trip I recall awakening that first morning to look out on a cloudscape tinted by the rising sun.

But my thought roves to the problem of Quetico-Superior on the border of Ontario and Minnesota — a serious problem created by this very man-made machine that I have been admiring. The airplane, flying into a wilderness preserve, with a group of picnickers or a group of fishermen, and taking them out again, thus effectively thwarting the very purpose of the wilderness; the airplane flying into a wilderness area with

roaring mechanization, into an area from which the mechanization of the streamliner, the automobile, and the motorboat have been excluded; the airplane thus used can not be looked upon as the benign product of science that the trans-oceanic clipper can be. Nor can such an airplane be the beneficial instrument that the same machine might be when carrying people overland to the *border* of a park or wilderness reserve; to the *border* of adventurous living by canoe, afoot, or on a saddle horse.

Place and purpose! We would not think of installing a miniature golf course in an art gallery, or permit band practice in the college library. Yet some pilots have been sincerely grieved because we wish to bar the plane from a few restricted areas from which we all agree the automobile should be barred.

But I pick up my magazine again. I read with a surge of joy and hope that the proposal for Glacier View Dam in Montana that threatened Glacier National Park has been abandoned. I read Herman Quick's article, "Disney Finds the Fur Seals," and remember discussing this film with the photographers, Mr. and Mrs. Al Milotte, when they returned from the Pribilofs. We had hoped then that this film would be a success with the public, to encourage further film adventure in the realm of "wildness."

I turn the page to "Dew: Nature's Miracle" and remember the day Donald and I were photographing dew-spangled spiderwebs in the rain forest of New Zealand's Fiordlands. Grasshopper mice, land crabs, buttonbush, glaciers, foxes, bees, clover, woodchuck, stars — these form the substance of the reading furnished me by the stewardess. This is part of the reading matter made available on a trans-oceanic plane. I recall other bulletins and magazines — from New Zealand, Australia, Sweden — devoted to the subject of the so-called preservation of Nature. I recall the panel of the Pacific Science Congress at Christchurch devoted to this subject. This awakening in people everywhere can not be ignored, and I feel hopeful of the future.

A few days more of travel; a few more thousands of miles; over the Equator; a day or two in Fiji; a few days at Hawaii National Park. Then our plane will settle down at Seattle Airport. Then out to Olympic Peninsula, to the appointed place in Olympic National Park. Here, on the appointed day will be gathered the Council of The Wilderness Society. Here, within a national park that is threatened now as never before, we will review the past year's gains, and our hopes for the future. There will be the problems of the wilderness areas to consider. Lake Solitude is not yet safe — the Bureau of Reclamation has not yet agreed to announce that it is safe. There is still board feet versus inspiration in some other areas. There is Olympic National Park to defend, the Grand Canyon, the sugar pines, sequoias, redwoods, the imminent destruction of the wild beauty of Mt. San Jacinto, Quetico-Superior, Adirondacks of New York, Jackson Hole, conditions in Alaska. There is overgrazing on primitive areas, pending legislation, the perplexities of finance, appraisal of the year's gain in membership, without which we can not carry on.

I know, too, that there will be the enthusiasm and optimism and determination of the Council members themselves. There is the consideration of cooperation with other organizations, the most hopeful of modern trends in conservation. Perhaps latest news from the Natural Resources Council, an establishment that undoubtedly will prove to have tremendous importance. There will be intimate news from the Wildlife Conference and the annual convention of the Izaak Walton League, both of which I missed this year; news from the Wildlife Society, National Parks Association, Audubon Society. *Nature Magazine* I have just read. And what helpful books have been published during the past six months? What is the latest from the Sierra Club, the Federation of Western Outdoor Clubs? What has been going on in America?

I glance out at the whirring propellers again. They fascinate me. They are taking us (at how many miles per hour?) on toward that meeting of kindred souls — toward home!

★

The Fern

By GEORGE CARRINGTON MASON

Born in a drop of dew, the winged fern,
Abloom and fruitful without flower or fruit,
Unfurls its airy pinions to the light
In all their rhythmic grace and symmetry.
Up-thrusting spiralled croziers through the mold,
It lifts above the leaves its lustrous head,
Unrolling to the tip each fragrant frond
In lacy, pinnate tracery,—the whole
A miracle of growth and tender strength,
With hardihood to live through summer's heat
And spread unwithered wings above the snow.

By waterfalls in mountain fastnesses,
It drapes the craggy rock above the stream
With pendent, airy sprays; hangs with a rich
And verdant tapestry the lofty banks
Of wheel-worn country roads; and rain-refreshed,
Makes bright with spreading clumps of feathery green
The somber boles of veteran forest trees;
Or adds its benediction to a wall,
Already blest by moss and lichen gray,
That guards an ancient churchyard in the shade
Of aged oaks set out by hands long still.

The white-crowned pigeon of the Florida Keys is very wild and shy, and lives in a land that is strange and difficult to explore.

White-Crowned Pigeons

By WILLIAM Z. HARMON

Photograph by the author

Down among the Florida Keys, near Big Pine Island, is a group of islands called the Bahia Honda Group. They lie to the north, or on the Gulf side of the main chain of Keys. The easternmost island of the group is appropriately known as East Bahia Honda Island. It is rather small, probably containing less than one square-mile, and is uninhabited except for rails, red-winged blackbirds, various warblers, mangrove cuckoos, miscellaneous herons and egrets, two or three families of ospreys, and several hundred families of white-crowned pigeons during the late spring and summer months. Did I say *un*inhabited?

Only a few tiny spots remain above the waters of normal high tides, so, like most of the Florida Keys, East Bahia Honda supports its protecting entanglement of mangrove trees. It was through this tangled mass of root-limbs that I found myself, one morning in August, picking a way in search of the white-crowned pigeon.

Although the going was rough and quite difficult, the nests were easily found by following the sounds of the disturbed birds. The nests were placed at varying heights above the water — from about one foot to twenty-five feet — and were rather flimsy in construction. Generally speaking, they were built of small, dead twigs and contained no lining, although three nests, out of seventy-five or eighty examined, did contain a small quantity of straw lining, adding to comfort.

After searching for some time, I found a nest that appeared to be especially suitable for photographing. It contained the usual two white eggs about the size of those of the domestic pigeon, and was only about six feet above the water. About one hundred feet from the nest was a "perch" in a fairly concealed place in a large mangrove, from which the nest could be observed. I set up a twelve-foot tripod about ten feet from the nest, attached a few branches to it for camouflage, and placed an old bucket on top in lieu of a camera. Then I cleared a line of sight from the nest to my perch. After these preliminary preparations, the set was allowed to "age" for two days so the birds would become accustomed to the strange apparatus. Then followed five days of patient but painful waiting before I was rewarded with the picture above.

As was usually the case when working in such a locale, the greatest thrills came from creatures other than the ones I was trying to photograph. Once I heard a faint rustle in the leaves above my head. I slowly turned my head upward, and there, less than two feet away, peering at me through an opening in the foliage, was a mangrove cuckoo. It was a beautiful specimen and I had ample time to study it at close quarters before it continued on its way.

Many warblers paused curiously in their eternal

search for food, to observe this latest addition to their sanctuary. Black and white warblers were most numerous and often stopped by for a chat, perching on twigs so close I could have touched them.

Of continuing interest were the actions of the Virginia and clapper rails. They perched on my tripod to preen their feathers. They ran hither and yon, often passing directly beneath my perch in the mangrove. They fought their neighborhood battles, and chastised their coal-black youngsters. They chased intruding rails from their chosen hunting ground; then, successful, haughtily sounded their defiant call at the defeated.

Occasionally this passing parade was broken by the cooing of white-crowned pigeons, reminding me of the task at hand — waiting — waiting — waiting.

Several times during those long days one of the adult pigeons came close to the nest, then for two or three hours would sit there undecided, and finally fly off in another direction. One pigeon came repeatedly to a tree less than thirty feet away, and pulled twigs for a new nest. A grown squab sat in a tree some distance away and whistled its baby cry hour after hour. Several times it tried to alight upon its old home nest only to be beaten away by its erstwhile parent, who evidently feared the awkward youngster would knock the new eggs from the nest. So I concluded from this, and the presence of many other grown squabs in the vicinity, that two settings were made each season. I could not help but reflect on the dangerous results to this second family in the event of a hurricane. Certainly this was no remote possibility for already the hurricane season was well advanced.

About ninety-five percent of the nests I examined contained eggs in various stages of incubation, from fresh to almost ready to hatch. This meant that it would be the first of November before the first of the young pigeons would be ready to leave the nest. Obviously, the greater portion of this second family would be lost to wind storms before they ever left their nests, and their parents and elder brothers and sisters would migrate to the more southern Gulf shores and Carribean islands without them.

Finally the day did come. It seemed as though the skin of my posterior had begun to fuse to the bark of the mangrove limb on which I had been sitting. One of the adult pigeons lit on a limb about twenty feet from the nest. About an hour later it flew to a limb about twelve feet from the nest. I began to hold my breath. Some forty-five minutes later it moved to a branch above the nest and half as far away. My heart seemed to pound in my throat. Was this to be another false alarm? Then, after what seemed to me an eternity, my would-be subject dropped to the limb on which the nest rested, and made its way quickly to the nest. Then the supreme moment as I gently pulled the camera release. The bulb flashed and I expected to see the pigeon burst away. Instead it settled upon the eggs as though nothing had happened.

After the exposure was made I took what I felt was the first breath of air I had breathed in hours. I began to wonder. Had I pulled the slide? Did I cock the shutter? Had the wind blown any foliage in front of the lens? Had the film become fogged after being baked in the sun for so many hours? These and many other questions were answered several days later, when, in the darkroom, the almost perfect latent image appeared out of the developing solutions.

Many will say, "Too bad it wasn't in color." But if it were in color, the chances are that few people would ever see the picture. Black and white reproduction is economical and many publications are not able to reproduce color pictures. So perhaps the reader will fill in the color in his imagination from this description.

The general, over-all color is a dark bluish-slate. The white on the head in the picture actually is white. The iris is a light chrome-yellow, and the bill a slate-gray, lighter on the tip. Feet and legs are light crimson. The scale-like rows on the neck are an iridescent bluish-purple. The bird can cause these rows of feathers to stand out at will, thus giving the effect of scales.

The white-crowned pigeon is a strange and extremely wary bird, at one time shot and persecuted to within an inch of its very existence. Under careful protection of Federal, State and Audubon wardens, it has begun to increase in numbers. It lives in a land as strange and difficult to explore as the bird is to approach. So most bird students will be content to sit in their boats, with their binoculars, on smooth coral reef waters, rather than to fight the almost impenetrable tangles of growth that make up the interesting flora of the Florida Keys.

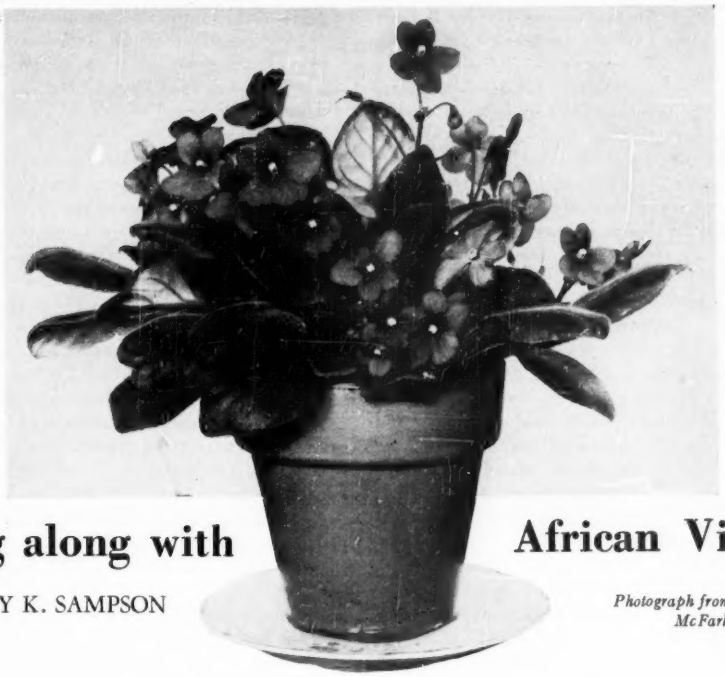
★

The Cockroach

By W. F. JENKINS

(Scrupulous in their respect for the rights of one another,
they make no war on their own kind.—Science Note.)

By far the oldest sentinel of Time!
What make you stay when dinosaurs are gone?
You watched us come, and watch as we begrime
The earth with brothers' blood; while you alone
For your two-million centuries would scorn
To wrong your kind. Your station man derides
With loathsomeness; you found him yestermorn-
Another of those short-lived fratricides.



Getting along with African Violets

By DOROTHY K. SAMPSON

Photograph from J. Horace McFarland

SOME fifty years ago the African violet, *Saintpaulia*, was discovered in East Africa. It has just been in the last few years, however, that it has taken many flower enthusiasts in this country by storm. Now practically everyone I meet has dabbled somewhat with these Africans. But the more I talk to people about these violets, the more firmly I become convinced that their frequent failure to produce healthy plants is due, in no small part, to the fact that they are afraid of their violets! I have found, too, that many of the bugaboos veiling the growing of *Saintpaulia* have been exaggerated. It is true that these plants are inclined to be temperamental, but that is what makes them interesting.

It is not really difficult to grow African violets, but their very definite requirements must be understood. They can be grown successfully in many ways, and I suppose this is one reason why people find them puzzling, and look askance at anything but their own recipe for watering and general upbringing. What one person recommends, another doubts, at least until it is successfully tried.

I know, from experience, that the plant can be satisfactorily grown in sheltered spots in the garden, or on a shaded porch during the summer months. If carried out to the garden, the pots should be sunk in the soil and watered thoroughly and regularly. The African violet should not be casually trusted to the open garden, however. A spot under a large tree, or where there is abundant underbrush of ferns or other woodsy plants, is ideal as encouraging habitat for these immigrants.

I have heard that some people have wonderful luck growing the African violet in water; not simply rooting it in water, but growing it from a small plant until past the blooming stage. I have just started one this way and so far it seems to be doing all right.

However, you do not discover these things without patience, understanding and experience. Some people do not wait that long before they say to themselves, "I can't grow violets — and that's that".

When my husband and I first attempted to grow *Saintpaulia*, we thought it about as obstinate as anything whose path we had ever crossed. We could not see that our own inexperience was causing the trouble and that we were blaming the plant for our own lack of knowledge. By way of compensation, we cannot praise it enough now for giving us so much pleasure, and so much abundant bloom. Unbelievable as it sounds, it took us only the usual four weeks to get our first violet leaf started in water, and eleven months for that leaf to start growing after it had been placed in its pot.

It all began when one of our neighbors, hoping to initiate me into the Horticultural Order of "Always Water from the Bottom of the Pot," gave me a leaf from her very healthy Purple Prince. This leaf I was carefully instructed to put into a tumbler of water. Then, and this I was informed was a "must," I had to put over the glass a piece of wax paper, through which the stem of the leaf was allowed to touch the water. A rubber band was slipped over the glass and around the

wax paper to hold it in place during the critical time.

The leaf remained like this for about three weeks. Then one day I pulled up one corner of the wax paper and took a peek inside the glass. There were several little spidery looking threads protruding from the tip end of the stem of my violet. I was in such a state of excitement that I wanted immediately to plant the leaf, but my friend said I must wait for a cluster of green leaves to appear before I could disturb it. So I waited. In due course the tiny leaves appeared and I proceeded, without further ado, to put those dangling strings into the pot of earth. I know now that the little green leaves should have been laid on top of the soil and only the barest notion of dirt should have held them and the long roots to the pot, but I truly believe I planted that first leaf so that those rootlets went all the way to China.

Months later the one leaf still stood up straight and green, and looked the essence of health. It neither drooped nor turned brown. Every time I looked at it it looked healthier than the time before. But no other little leaves appeared and it just continued to flourish alone.

Finally the time came for our vacation. I handed my obstinate child over to my neighbor for her motherly care while I was away, secretly hoping she would be able to perform some act of voodooism, and that I would come back to find it over and done with its act of aloofness. However, upon my return home two weeks later, I was met at the front door by my friend's husband (they lived in the apartment above ours) and almost before he asked if we had enjoyed our trip, and to say that he was glad to see us back, he said in a sort of mournful voice, "Your violet looks like one of ours looked just before it died." It turned out that this was a pure, unvarnished falsehood, because the leaf looked just as straight and green and self-satisfied as it had the day we left. This went on for months and months. I was mad enough at times to throw pot and all into the incinerator, but curiosity alone held me back.

Exactly eleven months from the time I hopefully planted that one leaf, we noticed signs of it wanting to show people what it could do. I practically held my breath as each tiny leaf appeared. Now, six months later, it has eight blooms, and there seem to be a lot more where these came from. Of course, it is still in the youngish stage, but the leaves are as healthy looking as any I have ever seen — very strong and deep-veined. It looks as though it has a nice long future ahead of it.

Since my experience with our Purple Prince, I have found a much simpler and quicker manner of leaf-propagating saintpaulias satisfactorily.

First, cut off one or two of the leaves from the bottom of your mature plant. If you do not have a plant, then beg, borrow or steal a leaf from someone who is growing African violets, and begin one of the most fascinating of all hobbies.

Cover a fruit juice glass, or small tumbler of water, with a piece of wax paper. This can be held in place with a rubber band around the glass. Pierce the paper in as many places as you have leaves. Insert the stems in the holes so that they are completely immersed in water. Place the glass in a light but not sunny window, preferably a northern one. If you use water from the kitchen faucet, it is well to let it stand for a day before putting the stems in it so that you may first get rid of all of the chlorine.

After a while tiny rootlets will appear. This is a good time to change the water in the glass. When the little cluster of green leaves appears, which is just a matter of another week or two, begin to get ready to pot the plant. I use three-inch pots for the first planting, and regular potting soil of two parts garden loam and one part each of humus and sand.

Carefully place the cluster of leaves on the top of the soil in the pot, spreading the roots. Put an ordinary, small, wire hairpin over the stem of the mature leaf, if it has not decayed, just to hold it down until it can take root securely, and barely cover the rootlets with a very fine layer of soil. Then place the pot in a saucer and keep the saucer filled with water until the top of the soil becomes saturated. As soon as the tiny leaves begin growing, pinch off the old, big leaf. You then have the right to feel you have actually started an African violet.

I speak with the surety that comes from experience when I say that if you follow a few simple rules you will have no trouble in getting along with your violets:

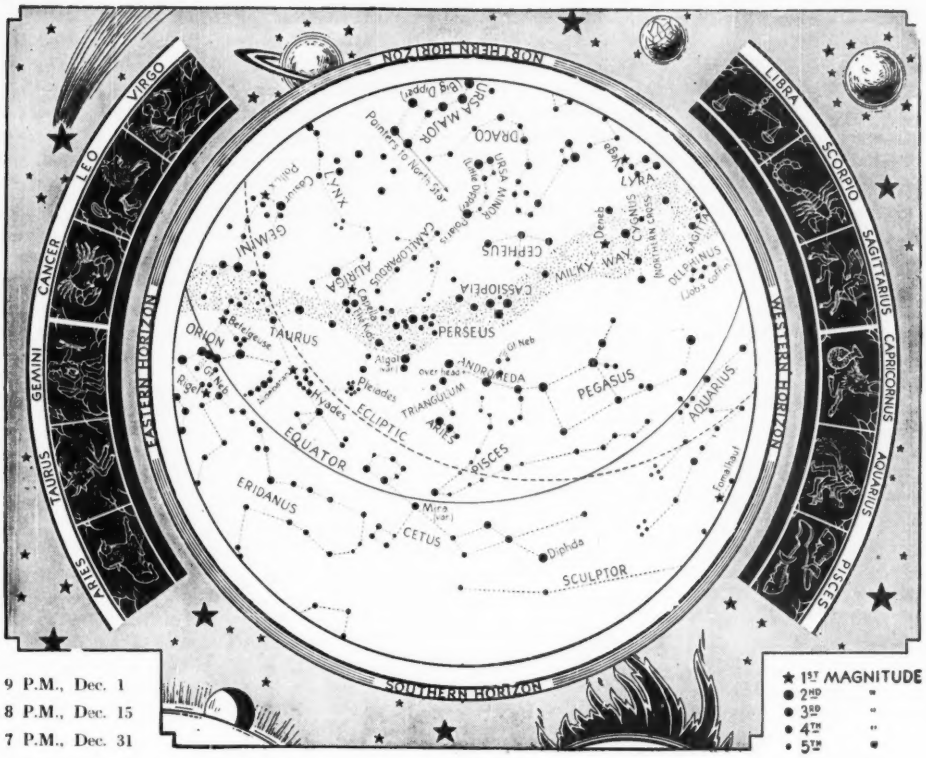
(1) Keep your plant in a northern window that lets in the light but very little sun. (2) Keep it out of excessive drafts. Never let cold air blow directly on the plant. (3) Water it at least every other day from the bottom of the pot with room temperature water. It is not a necessity to water from the bottom of the pot, but easier. (4) Do not be afraid of your plant. If it gets sick, doctor it, but do not start out by pampering it beyond its need.

I have started more than a dozen, and despite my first experiment, I have found the African violet easy indeed to get along with — and a continual source of beauty and pleasure. You can certainly enjoy them too.

Dandelion Seed

By LOUISE MAYERS MEREDITH

Wee gossamer white parachutes
Float gently to the ground —
Each paratrooper will give gold
Wherever lodging's found.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The Satellites and Their Names

By ISABEL M. LEWIS

RECENT discoveries of additional satellites in the solar system — a fifth of Uranus and a second of Neptune — have increased the total to thirty. Twenty of these satellites belong to the two greatest planets, Jupiter and Saturn — eleven to Jupiter, nine to Saturn. Three of the major planets, Mercury, Venus, and Pluto have, so far as is known, no satellites. So extensive has been the search, over a period of many years, for intra-mercurial, as well as trans-neptunian planets, that it is very doubtful if any small member of the solar system, either planet or satellite, could lie inside of the orbit of Venus and escape detection so long. One may feel reasonably certain that neither Mercury nor Venus has a satellite. It is not possible to speak with the same degree of certainty regarding Pluto, or even as to the existence of one or more major planets beyond its orbit. It would by no means be surprising, also, if additional small satellites of the four outer planets — Jupiter, Saturn, Uranus and Neptune — were discovered at any time.

Our own planet Earth has but one satellite, The Moon, which is unique in the solar system, not because of its size, since there are satellites of Jupiter, Saturn, and one of Neptune that surpass it in bulk, but because it is so large in comparison with the earth. The diameter of the moon is more than a fourth that of the earth. Were we able to set up our telescope and look out through it from Venus, the Earth-Moon system would appear as a brilliant and beautiful double star rather than as a normal planet and attendant satellite. It is doubtful that our planet has any small, undiscovered additional satellites, although some astronomers have played with the idea of acquiring a few extra satellites by means of earth-circling rockets.

Mars has the two smallest satellites, so far as is known, in the solar system. They were discovered by Asaph Hall at the Naval Observatory in Washington in 1877. It is recognized as the privilege of the discoverer to select the name for the object he has discovered, although if the object is a comet it usually bears the name of its discoverer; occasionally of two or even three discoverers if there is a question of priority of observation. Professor Hall chose the names of Deimos and Phobos for the two tiny satellites of Mars. These are the mythological names of the horses that drew the chariot of Mars, The God of War; also, as personified by Homer, they are the names of the sons of Mars. Literally Deimos means Fear, and Phobos is Flight, the outward manifestation of Fear. The larger and brighter of these two satellites is Phobos, and it is only about fifteen miles in diameter. It is also the nearer of the two to the surface of Mars. Phobos is remarkable for the fact that it backs around the planet, contrary to the usual diurnal motion of satellites, which rise in the east and set in the west. Phobos makes one trip around Mars in 7 hours and 39 minutes, which is less than a third of the time that it takes Mars to turn once on its axis, and, as a result, the satellite rises in the *west* and sets in the *east*. It is also only 3700 miles above the surface of Mars. Deimos is smaller and fainter, only eight miles or so in diameter and about 12,500 above the surface of Mars. It takes 30 hours 18 minutes to make a trip around the planet, and has the normal east to west diurnal motion.

Jupiter has the largest satellite family of all the planets with its eleven known satellites. It is the only planet whose satellites are customarily referred to only by Roman numerals in the order of their discovery. The four historic, or Galilean satellites, as they are called, for their discoverer, Galileo, were the first objects to be discovered with his new telescope in January, 1610. Although they bear the names of Io, Europa, Ganymede, and Callisto of mythological origin, in the order of their distance from Jupiter, these names are rarely used and they are known, respectively, as Satellites, I, II, III and IV. They are among the most interesting of all objects to observe with small telescopes. The transits of the satellites and their shadows across the disk of the great planet, and their eclipses in its shadow and occultations behind its disk, are continually occurring phenomena predicted for the use of observers in all national almanacs. Observations of the eclipses of Jupiter's satellites led to the discovery of the finite velocity of light, an important discovery to astronomers.

Two of the Galilean satellites, III and IV, are larger even than Mercury. Satellite I is fifty miles smaller than our moon, and II is 300 miles smaller. The discovery of Satellite V, which is only 150 miles in diameter and is the nearest to the planet of all its satellites, was made by Professor Barnard at Lick in 1892. It can be seen only with the aid of great telescopes, and this is true of all of the remaining satellites of Jupiter. Three of them are grouped at distances of about 7,000,000 miles from the planet, and three more, after a great gap, at distances of from 14,000,000 to 15,000,000 miles. The latter group composed of XI, VIII, and IX, all move in the east to west direction, or retrograde. This appears to be the more usual direction of motion for satellites that are at great distances and where the attraction of the planet for the satellite is weak. With the exception of Satellite VI, which is 100 miles in diameter, all of these distant satellites are 35 miles or less in diameter. Satellite X, discovered by Nicholson in 1938, who also discovered XI in the same year and IX in 1914, is the smallest of all Jupiter's satellites — only 15 miles in diameter. The last two to be discovered have never been seen except on the photographic plate.

Saturn has nine satellites in addition to its rings, which consist of countless tiny moonlets. Unlike Jupiter, all of Saturn's satellites have names from Roman mythology. In order of distance outward from the planet its satellites are known as Mimas, Enceladus, Tethys, Dione, Rhea, Titan, Hyperion, Japetus and Phoebe. They are, with the exception of the first two named, the earliest of the deities, known by the name of Titans, all of whom were closely related to Saturn, also a Titan.

Mimas, the smallest and nearest to Saturn, is only 30,000 miles beyond the rings. Its diameter is about 400 miles. Enceladus, about 33,000 miles more distant from Saturn, has a diameter of 500 miles. Tethys and Dione come next with diameters of 800 and 700 miles respectively. Titan, the largest of all the satellites of Saturn, has a diameter of 2600 miles, so it is appreciably larger than our own moon. Next to Titan in size comes Rhea with a diameter of about 1100 miles. These two may be seen even with small telescopes. Titan is easily picked up with a three-inch telescope. Japetus, which is 1000 miles in diameter, is the most remarkable of all the satellites of Saturn. It always keeps the same face turned toward Saturn as our own moon does toward the earth, but the two (Continued on page 502)

Who Designed The Star?

By CAMILLA WALCH WILSON

Who made the pattern for a star?
I'd surely like to know.
Some teacher of geometry,
Of many years ago?

Perhaps an ancient architect
With compasses and rule,
Worked it out so perfectly,
In some forgotten school.

The answer to your question lad
Lies in an apple's heart.*
The Great Creator fashioned it
The Master of all art.

*To see the star, cut an apple cross-wise. If you cut from stem end to blossom end you will not find it.

VANILLA BEANS

(Continued from page 471)

their own pods, more often they carry them to a cooperative association where the work can be better regulated. In all the years that vanilla has been grown, the method of curing has undergone only slight local variation.

First the pods, in a given number or bulk, are placed in a basket and dipped in hot water — not quite boiling. Drained, sometimes lightly dried with a cloth, they are then spread out on blankets in the sun for the afternoon to dry. At night they are wrapped in these blankets and packed in tightly closed boxes. For several days they may be dried by day and sweated by night until they assume a dark chocolate color. Then the long process of curing begins, with daily inspection to watch for signs of fungus infection or other irregularities. When special care is taken, the pods are wiped with glycerine or sweet oil and gently rolled in the fingers from time to time to keep them pliable.

This curing process, in which the pods are kept carefully separated from one another on broad shelves covered with blankets, requires four or five months of constant attention. As the individual pods become sufficiently dry, they are removed to packing boxes, and inspection continues there until the boxes are filled and finally sealed.

The vanillin (vanillic acid), which gives them their characteristic odor, does not become evident until well along in the curing. By the time the pods are ready for packing, the best ones have a frosty coating of tiny, needle-like crystals of vanillin.

But this is not the only flavoring principle in true vanilla. There are also minute quantities of other aromatic substances, some not as yet identified, as well as resinous matter, moisture, ten percent of sugar, and eleven percent of fat. In drying, the pods lose from sixty-five to eighty percent of their weight and a comparable amount of their diameter.

Once the pods are boxed and sealed for shipment, all that remains is to make the extract, and this is usually done in the country in which it will be consumed. It is prepared by cutting the pods into small pieces and soaking them, sometimes for a month, in alcohol, shaking the mixture occasionally.

Although some people like to pepper their ice cream or cake batter with freshly ground vanilla pods, as proof that their flavoring is genuine, most vanilla reaches the American kitchen as an extract in about thirty-five percent of alcohol. The housewife who can obtain cured vanilla pods can easily make her own extract by grinding the pods to a powder, soaking them in alcohol forty-eight hours, then filtering the infusion. However, most people will prefer to buy the bottled extract that is so laboriously made.

Better Late Than Never

Editor, Nature Magazine

If I am late with this year's subscribing membership it's all your fault. You have so reawakened my devotion to Nature that I have spent your four bucks twice over this summer providing peanuts at two-bits a sack for a rapacious and rascally family of bluejays, now in complete possession of my garden and patio.

It started early in August when I was visited by a somewhat bedraggled and obviously harrassed female jay, who gave every indication of a mother in search of food for a late-hatched family in the adjoining eucalyptus grove. On my patio writing table were some unshelled peanuts, and I tossed out a couple. Her antics in trying to carry off both goobers at the same time so delighted me that I kept it up. She brought the old man, of course, and between them they took away, or buried, all I had.

Out of peanuts, I returned to my book, only to glance up and find both of my guests sitting on the table waiting for more. They bowed to me in that odd, jerky way jay's have — and yelled "peanuts" in jay talk. So I went to the corner grocery for another sack, and from then on it's been a daily ritual. I tried weaning them to something less expensive, but no luck. It was peanuts or nothing.

Then the miracle — early in September, mama jay turned up with her brood of three and you've never seen such handsome youngsters anywhere in the wild. Without exaggeration all three were nearly twice the mother's size and their plumage was gorgeous in color and sheen. The extraordinary virtues of the peanut as an all around food had been fully demonstrated. I am the foster-father of a new species — *Aphelocoma california giganticus.*

The only trouble is my patio is no longer a place for rest and reflection — and a little work. When I sit down to read or write, three enormous young brigands in glistening blue and gray uniforms take complete charge of me and anything portable. My two dogs they ignore with assured contempt. If I try to have lunch al patio they steal most of it. And all the time they keep up a clamor for more peanuts. I've tried to explain to them that if they don't give me a chance to write, I can't earn enough to keep them in peanuts, but like all gangsters they are adamant. It's a problem!

RICHARD SCHAYER

A Good Story

A Nose for Trouble. By Jim Kjelgaard. New York. 1949. Holiday House. 250 pages. $2.50.

This is an adventure story by this well-known writer of outdoor stories, and it is concerned with the vital need of conservation of our wildlife. It is a thrilling yarn of a fight against poachers and game law violators, and is full of woods wisdom and action.

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Camera Trails

By EDNA HOFFMAN EVANS

THAT time is here again. Let us go Christmas shopping. In preparation for this annual give-camera-equipment-as-Christmas-gifts section, I wrote to a dozen or more of the major photographic supply houses for their latest data. Now, as I sit at my typewriter with their replies heaped on the floor around me, I have that "how in the world shall I begin" feeling.

Already I can feel the hurry and bustle of the Christmas rush. I can picture shoppers, their arms filled with presents, their pockets stuffed with lists of what to get for whom, and their pocketbooks — well, the less said about their pocketbooks, the better.

But the Christmas feeling is a nice one, just the same, and somehow, the pocketbook always recovers in time for another flattening when the next holiday season rolls around. It is nice to get presents, and sometimes it is even nicer to give them, expecially if we can feel that the gift will be welcomed and appreciated. And camera equipment is welcome, for there is always something more that the camera fan likes to have added to his already bulging bag of gadgets.

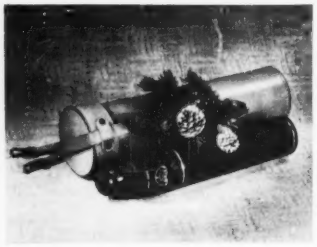
First item to be considered on any photographic Christmas list is the camera. Here the prospective giver has a wide choice — wider this year than at any time since the war ended and photographic supplies came swarming back to the dealers' shelves. There are large cameras and tiny cameras — quarter-pint sized ones, small enough to be strapped to the operator's wrist, or hidden about his person so that he can take pictures without anyone suspecting. These little cameras make interesting toys, and no doubt they serve their purpose when such extreme hush-hush is necessary. But, on the whole, I would not recommend them for serious camera work.

The price range is as great as the choice of cameras. There are very cheap ones and very expensive ones. Remember, in choosing, that increased price means greater versatility — better lenses, faster shutters, greater distance range and increased accuracy in focusing. If you are going to skimp on price, think twice before you buy a camera. Here is one case where a good investment really pays off.

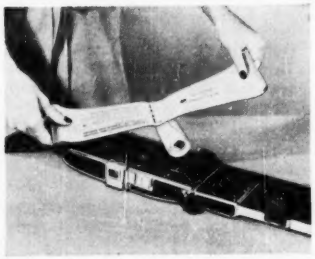
A comparative newcomer in the field of photography is the Polaroid Land Camera, which turns out finished prints a minute after the picture is taken. This eliminates that uncomfortable period of waiting in suspense while the negative is developed and the picture printed under ordinary darkroom conditions.

This polaroid camera, invented by Dr. Edwin H. Land, president of the Polaroid Corporation, Cambridge, Mass., sells for $89.75, tax included, and the special eight-picture film it requires retails for $1.75. There are other accessories, too: carrying case, exposure meter, and meter case. The camera, itself, looks much like the conventional folding-type, and it takes a 3¼ x 4¼ sepia-toned picture. Its chief drawback, for people who want more than one print from their negatives, is that ordinarily the negative cannot be re-used. Company literature mentions an attachment for the camera that enables the user to make as many extra copies as he wants at the rate of one a minute. Lacking this, ordinary print-copying methods may be used to obtain additional prints, or originals may be sent to the company for copying. For the impatient soul who wants his picture right now, this picture-a-minute process should be just the thing.

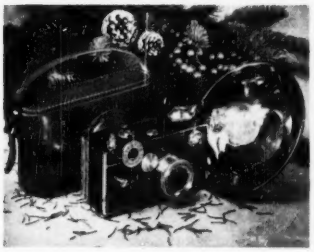
Our photographic editor says that this greeting speaks for itself and assures us that it is a real live deer, too.



Left, Bell and Howell's pocket size Filmo movie camera; below, Argus' 20-x observation telescope; right, Eastman's Kodaslide Compartment file. All are Christmas suggestions.

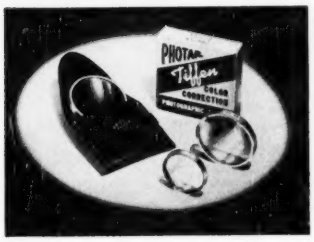


This Polaroid camera prints a picture a minute.



Argus C3 with flash adapter and case.

The Foto-Rule aids close-up accuracy.



The Tiffen Photar color correction filter.

From Argus, Inc., Ann Arbor, Mich., comes an imposing list of equipment, prepared and posed especially for Christmas. I have had an Argus, myself, for a long time, and I rather favor these cameras. They render good service in the fields for which they are suited.

The Argus 75 is a good one for a beginner since no technical photographic knowledge is required to operate it. A twin-lens camera that allows the photographer to see what he is taking while he takes it, and a double-exposure prevention system, are particularly suited to amateur operation. Its price, too, is not prohibitive for it is listed at $12.95, plus tax.

Bell and Howell's Filmo Regent, an 8mm. movie projector.

The Federal enlarging camera.

Higher-priced members of the same family are the Argus model A2, model 21, model C3, and the Argoflex EF and EM. Argus C3 and Argoflex EF seem to be best adapted to the needs of Nature photography, while additional filters, adapter rings, and lens shades add to the cameras' versatility.

Also of Argus manufacture is the 20-x observation telescope, which seems to have gained considerable recognition as an aid on field trips and in wildlife surveys. This sells for $74.50 with protective lens caps, while the leather carrying case is $15.00 extra.

Another excellent line of cameras, ranging in price from the $50 bracket to more than six times that much, are the Zeiss Ikons, distributed in this country by Carl Zeiss, Inc., 485 Fifth Avenue, New York. They range in size from 35mm, through the Ikoflex, which is a 2¼ x 2¼ reflex, to the Ikontas which use 120 or B-2 roll film.

Still another in the twin-lens, 120-film-size group is the Ciro-Flex, which comes in four different models and in varying prices, depending on shutter type and speed.

Bell & Howell, long outstanding in the movie field, have a 35 mm still camera — the Foton — on their list of photographic materials. The Foton can take a series

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of pictures — ten or fifteen without pause — and thus can follow any given action from start to finish. It has eleven shutter speeds, ranging from bulb to 1/1000th of a second, and can be used with or without flash adapter.

In the movie line, Bell & Howell offer both 8 and 16mm cameras. There is the Filmo Auto-8 and the Filmo Auto Master, as well as numerous others, to suit the needs of a variety of movie makers. There are so many, in fact, that I suggest a visit to a company dealer, or a note direct to the home office at 7100 McCormick Road, Chicago 45, for additional information and literature. If you are interested in projectors, Bell & Howell have them, too.

As for enlargers — those aristocrats of the darkroom — they are as numerous as the cameras.

Eastman Kodak Company has just lately announced the development of two new-type enlargers — the Kodak Flurolite enlarger and the Kodak Hobbyist enlarger — both of which should be on the market by now. The former is intended for more exacting photographic work while the latter is better suited to non-commerical photographers who still want to turn out high quality work in their home darkrooms.

Both models make use of a "cold light" in the enlarger's lamphouse. This is a 22-watt, circular, fluorescent lamp, used in conjunction with a special highly reflective white paint. Such an arrangement is reported to give stronger, steadier light, without causing the enlarger to become excessively hot even after long and continuous use. Since they are so new — the Flurolite model was to go on sale in October and the Hobbyist in November — it might be well for prospective enlarger buyers to look them over before making a decision.

If you do not live within reach of a well-stocked photo supply dealer, I suggest writing to Burke & James, Inc., 321 South Wabash Avenue, Chicago 4, for their interesting 52nd annual catalog. Mention Camera Trails. This lists all sorts of camera equipment. No camera fan can leaf through its pages without feeling his mouth begin to water and noticing a definite "I've-just-gotta-have-that" itch beginning in his trigger finger.

For those interested in correct exposure, there are a number of good meters at varying prices on the market. For a readable discussion of exposure problems, plus an application to the Norwood Director meter, write Director Products Corporation, 2 West 46th Street, New York, 19.

The Federal Manufacturing and Engineering Corporation has a new device — an enlarging camera — that makes still enlargements from 8 or 16mm movie film. The camera is particularly useful, the manufacturer points out, for enlarging and reproducing still pictures from good sequences in movies of wildlife. All too often in the past, you know, still enlargements from movies have looked blurred and somewhat out of focus. For the Nature fan who can afford a battery of cameras and gadgets, this would be an interesting addition to his collection.

Most of the above mentioned items have been in the fairly expensive price brackets, and some definitely in the luxury class. Personally, I never expect to own many items of that nature, but at Christmas time we can all flatten our noses against the store windows and wish. Who knows — maybe there is a Santa Claus, after all.

Now for some gadgets, not quite so expensive, that a photo-fan might be glad to find in his stocking or under his tree on Christmas morning. There are plenty of them, too.

For filing the 2 x 2-inch mounted slides of miniature black-and-white or color transparancies, Eastman has a new file box. Unlike the usual slide file box, the Kodaslide Compartment File consists of twelve compartments hinged together in such a way that they form a complete box when closed. Each compartment, which will hold up to twenty cardboard-mounted slides, is open along the top and sides. When in use, the individual compartments can be swung out from the base of the box so the contents can be readily removed or replaced. This new file box is priced at $3.75.

The Tiffen Manufacturing Corporation, 71 Beekman Street, New York 7, has on sale a new Daylight Flash (2B) Photar color correction filter which can be used both as a correction for indoor flash shots and for scenes made outdoors in late afternoons, evenings, and around sunrise. Filters are available in six different lens diameters. Write the company for further information.

Another gadget, this one to eliminate focusing guess-work in closeups with auxiliary lenses — is the Foto-Rule, sold by the Foto-Rule Company of Monrovia, California. It is a steel measuring tape in a chrome steel case. It can be screwed into the tripod recess of either still or movie cameras, so the cameraman can measure distances and still have both hands free to operate the camera. It sells for $3.00 postpaid.

And that, I guess, just about winds up our annual Christmas camera shopping expedition. Frankly, I am tired — just as tired as though I had been tramping from shop to shop looking at all the things instead of just writing about them.

But I am not too tired to lose that good holiday spirit. And, since I cannot reach everyone by mail, I am tucking in my own photographic greeting card, intending thereby to wish each and every one who reads this a very Merry Christmas.

THE SATELLITES

(Continued from page 498)

sides must differ greatly in their physical features because one side reflects five times as much light as the other side. Japetus is at a distance of 2,200,000 miles from Saturn. Its nearest neighbor is Hyperion, a small body only 300 miles in diameter and distant about 920,000 miles from the planet. Phoebe, discovered by Dr. William Pickering in 1898, retrogrades in the same manner as the three outermost satellites of Neptune at a distance of 8,000,000 miles from Saturn. It is a small body about 200 miles in diameter and is another object for large telescopes only.

Uranus had four known satellites ranging in diameter from 400 to 1000 miles until the discovery of Dr. G. P. Kuiper of a fifth satellite with the 82-inch reflector of the McDonald Observatory in March, 1948. The names of the four — Ariel Umbriel, Titania, and Oberon — are well-known. Oberon and Titania are king and queen of the fairies in *Midsummer Night's Dream*. Umbriel is a gnome and Ariel a sylph in Pope's *Rape of the Lock*. It is in the keeping with the names of the other satellites that the name chosen for the fifth satellite should be Miranda, who was the daughter of Prospero in Shakespeare's *The Tempest*. The fifth satellite is nearest to Uranus and faintest of all these faint satellites, observable only with the largest telescopes.

Neptune has now a second satellite, also discovered by Kuiper at McDonald Observatory on photographic plates. The first of these was taken on May 1, 1949. An extremely faint object was found sharing in the motion of Neptune and undoubtedly a satellite. A preliminary orbit has been found for the satellite. It takes two years to complete a revolution around the planet and it is approximately 200 miles in diameter. Triton, the first satellite of Neptune to be discovered, was found by Lassell in 1846, within a month of the discovery of Neptune. It is much larger than our moon, about 3000 miles in diameter, and so comparable to Mercury in size. It also moves in a retrograde direction in its orbit. The name Nereid has been suggested by Dr. Kuiper for the second satellite. The Nereids were sea nymphs and with the Tritons were attendants of Neptune.

In December Mercury is poorly placed in the southwestern evening sky, appearing only 12 degrees above the horizon at sunset on December 31. Venus will be a magnificent object this month in the southwestern evening sky. There will be an interesting conjunction with Jupiter on December 6, and it will be at its greatest brilliancy on December 26. Mars is now rising about midnight. It moves from the constellation of Leo into Virgo during the month, and its distance from Saturn is increasing. Jupiter is now in the southwestern evening sky in the early evening and sets a few hours after sunset. Saturn is still in the morning sky rising about midnight in the constellation of Leo.

On December 21, at 11:24 P.M., Eastern Time, the sun will be farthest south of the Equator, and winter will commence in the northern hemisphere.

CHRISTMAS TREES

Continued from page 480)

factor lends a pleasing "lacy" appearance to the hemlocks. Whereas the central stems of the spruces, true firs, and Douglas fir are rigid and erect, that of the hemlocks is weak and droops gracefully under its own weight. This sets the hemlock apart, and prevents its use as a Christmas tree that can support a heavy ornament at its tip.

The Douglas fir is one of our most important Christmas trees. Although it grows naturally over a wide area from the Rockies to the Pacific slope, it is in the coastal forests of British Columbia, Washington, and Oregon that it reaches its best development. It is one of our most important timber trees, and, under proper forestry practices, it rapidly restocks cut-over lands throughout that region. A dense stand of young Douglas firs, developing from the seeds of the mature individuals that have been logged, is the reward of good forestry. Thousands of these young Douglas firs are annually cut for the Christmas tree market, generally the product of thinning operations, thus favoring the development of the remaining trees. These trees are shipped to many points throughout the country, so Douglas firs find their way into many homes far removed from their native haunts.

The Douglas fir is not a true fir, and is sometimes referred to as Douglas spruce. Lumbermen often call it "Oregon pine," and its scientific name, *Pseudotsuga taxifolia*, is a combination of Greek, Latin, and Japanese that means "false-hemlock-with-foliage-like-a-yew." But, although its varied names indicate a resemblance to the true firs, spruces, pines, hemlocks, and yews, it is nevertheless quite distinct from those trees. Consequently, with but four other species — three of which are native to the Orient, the fourth being an unimportant individual of limited distribution in California — it is placed in a distinct group of its own.

Of the hemlocks, four species are native North Americans. The two that are most likely to serve as Christmas trees are the eastern hemlock, found in the Northeast, the Lake States, and the Appalachian region, and the western hemlock, which is a common tree along the Pacific Coast. The other two species are the Carolina hemlock of the southern Appalachians, and the lovely mountain hemlock, found in the rugged timberline region of our western mountains.

The pines, rarely used as Christmas trees except in the South, are nevertheless of interest at this season because their foliage often figures in many related Christmas decorations. As already stated, the needles of the pines are borne in "bundles" of two to five. There is one exception to this rule, however, — in the single-leaf pinyon of the Southwest. Although the "bundled" arrangement alone separates the pines from other evergreens with needle-like foliage, there are other important distinguishing characters. The needles are longer than those of the spruces, true firs, Douglas fir, hemlocks, or redwood. They average from about two inches in length, as in the case of the two-needled lodgepole pine of the West, and the jack pine of the Lake States and the North, to eighteen inches in length, as is often true of the longleaf pine of the South. The ponderosa pine, found in practically all of the western states, is characterized by "bundles" of either two or three needles, while the white pines — which includes the magnificent sugar pine of Oregon and California — are characterized by five-needled "bundles."

Another group of evergreens whose boughs find varied uses in wreaths and similar decorations at Christmas time, but which rarely find use as Christmas trees, are those trees commonly known as "cedar." These are characterized by scale-like foliage. In this group one finds the northern white cedar or arborvitae, a common species in the Northeast and the Lake States, the western red cedar of the Pacific Northwest, and the incense cedar of Oregon and California. In addition, various species of western cypresses, the Alaska yellow cedar and Port Orford cedar, also westerners, and the junipers have scale-like foliage. Still another that can also be so classed is the giant sequoia, or big tree of the California Sierra, which, although it is closely related to the redwood, has foliage of a much different type.

Actually the name "cedar," as applied to most of the trees just mentioned, is technically incorrect for no true cedars are native to North America. Further, the foliage of the true cedars is needle-like and is borne in dense, brush-like clusters — quite different from the scale-like foliage of our native trees that are known by the same common name.

True cedars have been widely introduced in many parts of our country, where they serve in landscape plantings about homes and in parks. This is particularly true in the Pacific Coast states where the graceful beauty of the deodar cedar, a native of the Himalayas, is greatly appreciated. Often it is decorated and serves as a focal point of an outdoor display.

So *look* at your Christmas tree this year. Examine it more carefully and in so doing learn its correct name — is it spruce, true fir, Douglas fir, hemlock, redwood, pine, sequoia, or cedar? A more intimate acquaintance with this symbol of the season will add to your Yuletide enjoyment.

Planting Vegetables

The Vegetable Calendar. By William Eyster. Emmaus, Pa. 1949. Rodale Press. 96 pages. $1.00.

This is a practical and concise guide to the vegetable gardener and the vegetable garden, indicating the what, when, where and why of vegetable planting.

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The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

TIRA HOKI

This is being written in far-off New Zealand at a time when the radio is telling of terrific heat in my home New York, while, a few feet from the typewriter, the gray ducks waddle in the frost-covered lawn and sit on their toes to keep them warm. My friends write of how they suffer with the heat, and I write, in return, that I have not been really warm once since I came "down under." By the time this appears in print the traveler will return, hence the name of this article, which is Maori for traveler's return. With that return, he will take up where he left off but with a host of worthwhile experiences. It might be well to try to draw a few simple comparisons between New Hampshire, New Jersey, or New York and New Zealand for the benefit of those who may not have had the chance to have the experiences I have had. This must, of necessity, include consideration of climatic conditions, human relationships, and the school situation. Any one of these would, alone, provide an abundance of interesting commentary.

Of course, anyone versed in geography knows something of the Southern Hemisphere, even though this does not always show up in the literature we give to our school children, or appear in the standardized tests we use for determining their advancement. We know that the seasons are reversed, but until you fly from the North on the longest day of the year and land in the South the next day to find it is the shortest day of the year, you do not quite get the idea. Maybe we who are interested in Nature can get the picture better when I tell you what is going on outside my window as I write this right now. In the yard, you find witch-hazel, forsythia, hyacinths, daffodils, sweet alyssum, heather, flowering quince, flowering plum, grape hyacinth and crocuses, all in bloom at the same time. The fall-blooming witch hazel beside a late-spring-blooming daffodil, with crocuses and flowering quince and forsythia thrown in for good measure, make a rather startling situation, and make one realize that winter in New Zealand would not be considered winter in New York.

The evidence supplied by the garden flowers is emphasized by what is going on in the creek, not fifty years from where I write. There we find spots on the creek bottom occupied by brook trout, brown trout and rainbow trout, all obviously engaged in providing for the next generation. The little bare spot, started when I first came two months ago by some brook trout, is now still worked over by brook trout, but it is also visited, and I believe used now, by all three species, although the small initial spot has now been enlarged to a stretch three feet wide and at least twenty feet long. I have not seen the brown trout engage in what looks like egg-laying in this spot, but I have no doubt about the brooks and rainbows. Again this evidence squeezes winter out of the picture, in spite of the long woolen underwear that proves to be a lifesaver at all times.

Of course any journey to a foreign land brings you in contact with different kinds of people. This is one reason why we like to take these trips, and we are always impressed by both the likenesses and differences that may be observed. I happen to be in New Zealand under the Fulbright Act. I understand that I am to further sympathetic understanding between the two nations and to help where help is sought and can be given. I am constantly convinced that we need a Fulbright scheme with Russia much more than we do with New Zealand, but I must confess that I believe I am much happier here than I would be there, although again I may be wrong. This New Zealand experience has made me more than ever convinced that one must, whenever possible, reserve judgment based on hearsay until it can be checked with first-hand experience. I had been prepared by northern New Zealand to expect that I would find southern New Zealanders with little sense of humor, and yet I doubt if I ever met a more responsive, appreciative group than I did when I was as near the South Pole as I am ever likely to be.

I have always enjoyed entertaining New Zealanders when they have come to my home, but I doubt if my cordiality could ever even approach that which they have extended to me. Their smile-heated homes more than make up for the chill of their fire-place heated houses.

As in America, so in New Zealand, there are wide differences of opinion in matters dealing with natural history and its study. A government report recently released indicates that there is little serious soil erosion in the country. This was emphasized by a statement to me by a high government official, and yet there have been few places in the country where anyone could not get good pictures of rather spectacular erosion. I have plenty I am bringing back with me, and I only wish I could have taken one from the train yesterday where there was a flat plain rising in the distance to an increasingly steep slope with slips showing at the bare, higher regions, and obvious deposition of inferior soils on the superior soils of the lowlands. Possibly the committee charged with this report could not see what I saw, but the sheep did, as evidenced by their conspicuous absence from the eroded area to which they had unhindered access. I was told that this sort of thing could not be considered soil erosion if you defined soil erosion properly, and I could not help but smile at the similarity of this explanation with that so frequently used in America to define such things as prosperity, freedom, unemployment, speeding, drunkenness, saloons, cruelty, tolerance, obedience to law, justice and integrity and intelligence, as well as what constitutes an honest day's work for a normal human being and just pay for that work. If we are all free to make our definitions of things anything can be considered good or bad, but Nature just does not listen to our definitions, and, commission reports or not, New Zealand, like New York, and most of the New World, is losing wealth by unwise management of the top soil, which is the greatest source of wealth in any country.

In some respects New Zealand is as provincial as Manhattan. She is unduly boastful of the relative magnitude and beauty of some of her splendid glaciers, lakes and scenic panoramas. At the same time she seems almost wholly unconcerned about the fate of some of her penguin colonies where rabbit trapping is permitted, as my own right foot can testify to its sorrow. But she also has a right to be proud of many physiographic features, the like of which I have never been able to see in America, and proud of the all-out protection she is giving to some practically extinct species of birds. It might almost seem that her philosophy in regard to wildlife was to give everything a chance and if it abuses that privilege then do not accept the responsibility for its introduction. Rabbits, wallabies, Canada geese, "opossums," hedgehogs — these are but a few of the immigrants that seem to have abused the privileges extended to them. I do not know whether I have enjoyed most watching my first English skylarks in their courting flight or watching and listening to tuis and bell-birds in their native wilds. I would not take anything for the few minutes we had with an inquisitive kea that tried to solve the problem of what was in a small kodachrome can that we rolled on the ground just a few feet from where we stood. We regret that we did not have the opportunity of observing them using one end of their bodies to rip canvas covers on automobiles, and the other end to slide down iron roofs to the annoyance of those who were trying to rest beneath.

But I find that when I start on New Zealand natural history I overlook my obligation to make some report on the status of Nature study teaching in New Zealand. Without question, for understanding of general natural history problems I would back the average New Zealand school teacher against the average

(Continued on page 508)

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Under the Microscope

By JULIAN D. CORRINGTON

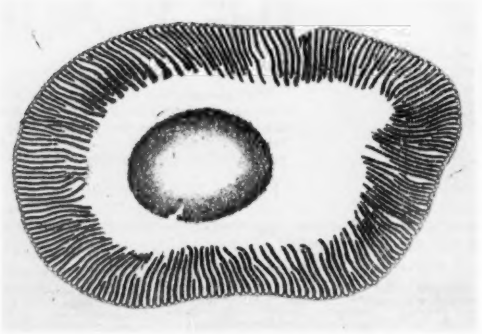
STIPES AND STEMS

AMONG the more ghastly outrages perpetrated by botany teachers upon unsuspecting beginners is that requiring identification of unusual plant structures. One ultimately learns that the honey locust thorn is a modified stem, whereas the thorn on a barberry twig is a highly altered leaf. An Irish potato is an underground stem, not a root like the sweet potato. One also gleans the information that mushrooms have stipes, not stems, and the microscope explains this distinction with ease.

In the higher plants the three morphologic parts are root, stem, and leaf, and, no matter how greatly modified, the trained botanist should be able to distinguish any organ or part encountered as being one of these three. Each has certain marks of identification. The true stem is a connecting column between the roots and leaves, serving to hold the leaves in position to intercept light rays; structurally, it must exhibit *vascular tissue*, that is, material composed of long tubular cells making up *vessels*, including the xylem that conducts water upward from root to leaf, and phloem that carries food downward from the leaf, some of it going to the root. Details of this construction were given in our articles *Monocot Stems*, and *The Dicot Stem*, appearing in the March and May issues of this Department for 1946. The ferns and their allies, and the seed plants, are vascular plants.

In the algae, fungi, lichens, liverworts, and mosses, on the other hand, should a stem-like structure occur, it will lack vascular tissue and by definition cannot be designated as a stem; some other word is then in order. The public will call the stalk a stem anyway, lacking knowledge in the technicalities, but the scientist must speak precisely. Such a case is met with in mushrooms.

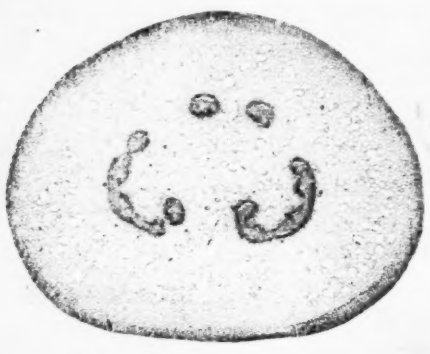
Mushrooms, some species of which are popularly dubbed "toadstools," are the visible fruiting bodies of a fungus plant, the rest of which is underground. This buried portion constitutes the *mycelium*, a tangled mass of filaments called *hyphae* (singular, *hypha*). Each of these threads grows and forks repeatedly, the branches interlacing to make a felt. Except for its reproductive structures, the entire mushroom plant consists of this mycelium of jumbled hyphae; there are no such organs as root, stem, or leaf. At the stage of plant evolution represented by fungi, these organs had not yet appeared.



Cross section of pileus (outer) and stipe (central) of mushroom, Coprinus, 15X.

Now comes a succession of warm rains, and suddenly, overnight, our mycelium puts up a fruiting body. "Mushroom growth" has become a fixture among terms indicating rapid and more or less flimsy increase, as of a frontier town. In the case of the plant, however, it must be remembered that the bulk of its substance is the underground mycelium and that long preparation is necessary before the object we call a mushroom appears above ground.

The typical mushroom has a stem-like portion and an umbrella-like cap. The "stem" is the *stipe*, the cap is the *pileus* (pī'lē-ŭs, L., cap). A popular commercial slide preparation, shown in one of our illustrations, is a cross section through pileus and stipe, below their juncture. Both are seen to be made exclusively of hyphae; the stipe exhibits no vessels, no distinction into bark and pith, no cambium ring, or other stem character. The outer circlet of tissue in the species illustrated reveals it to be a member of the gill fungi; other types may be pore fungi. Here the hyphae take the form of folds that hang down, reminding earlier students of the gills of fishes. These folds bear the spores, reproduction being solely asexual in this group. Accordingly, the correct botanical name for the above-ground structure in mushrooms is *sporophore* (spore-bearer) and the production of spores is seen to be the entire reason for being of these bodies, some of which are among the most delectable of foods, while others comprise the most poisonous among natural objects.



Cross section of so-called "stipe" of fern leaf, really a petiole, 25x.

Certain frondose species of algae, as the kelps, possess a stem-like portion of the thallus or plant body, composed of undifferentiated cells, and called the stipe, as in mushrooms. Unfortunately, the term stipe has likewise been given to a totally unrelated structure in the fern group. Here again, popular misconception has clouded the true state of affairs. That part of the typical fern one sees above ground is not a stem with many small side leaves. The stem is a rhizome — underground and horizontal. It puts up leaves at intervals and, as these break through the soil, they begin to unroll in a most characteristic manner. This uncurling frond is a single compound leaf, consisting of a long leafstalk or *petiole*, and many *leaflets*. These relationships were undiscovered at an earlier time, and stipe came to be the name for the fern leaf petiole. An illustration shows a cross section of such a petiole and exhibits differentiated cells, including vascular tissue — very unlike the simple, true stipe of the mushroom.

The singular of this word is pronounced stīp, the plural being stipes. The same spelling is seen in a zoological word, stipes, pronounced stī'pēz, plural stipites (stĭp'ĭ-tēz), used to designate various stalk-like portions of arthropod mouthparts. Both words are from the Latin stipes, a stock, post, or branch.

Robert B. Tolles

THE MICROSCOPE MAKERS
VII. Robert B. Tolles

OF THE three celebrated pioneer microscope makers whose genius and labors founded the Spencer Lens Company, the second was Robert B. Tolles. Member of a very poor family, struggling all his life against poverty and illness, poorly educated, yet reaching the heights in his chosen profession, Tolles' career was strictly Horatio Alger.

The second of five children of Elisha and Harriet Tolles, Robert was born in Winchester, Connecticut, in 1822. The father was an inventor, some of whose creations were patented, but could not be developed owing to lack of funds. The father's genius was to crop up in the son at a later date, but meanwhile Robert must work on his grandfather's farm to help support the family, his education limited to that of the district school. Young Tolles longed for a college education, but the nation was not then and is still unwilling to subsidize its high-calibered brains.

When eighteen, Robert suffered a very severe attack of pleurisy. This was to prove a crippling ailment from which he never fully recovered. When twenty-one, in 1843, his mother died and he went to visit an uncle in Rochester, New York, hiking most of the way. By mere chance, on the return journey, he visited the shop of Charles A. Spencer, in Canastota, New York, and was enthralled at what he saw. It is stated that he said "Here is the place and the work for me."

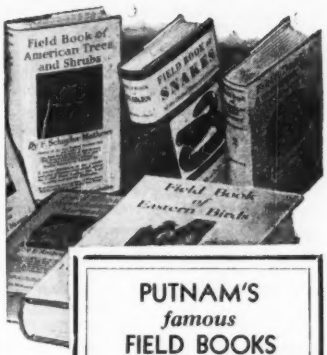
Tolles was forthwith taken on as an apprentice, his connection with Spencer accordingly dating from 1843, five years after Spencer had launched his own career. The affiliation lasted for fifteen years, during which the younger man thoroughly mastered practical and theoretical optics and added great luster to the firm's reputation with his work and inventions. In 1858 he went into business for himself in Canastota and had so far distinguished himself by 1867 that he was sought by a group of Boston business men and removed to that city, setting up the Boston Optical Works, with others as managing officers and himself as superintendent. Four years later he became the entire company, remaining in sole charge until his death, in 1883.

The last ten years of his life were spent in great suffering and pain, but he would not give up his beloved work. He would drive himself on, seated at his optical bench, when he should have been in bed. During his final illness he even had one of his microscopes brought to him at the hospital and tested his lenses until this was forbidden by his physicians. A few minutes before his death he counted the degrees of aperture of an imaginary lens. When he reached 150° he stopped, turned his head, and faintly said, "Good-bye."

Like his mentor, Tolles was a perfectionist. Dr. George E. Blackham, in his *Memoir of Robert B. Tolles*, published in *The Proceedings of the American Society of Microscopists*, 1884, stated that Tolles was never satisfied with his productions, but would spend time and money in striving to improve them even though they were already better than the contract called for and would have more than satisfied the customer. Consequently, though he received good prices, he was not a successful business man and failed to make money.

Among Tolles' creations were a solid eyepiece (1854) and duplex-front objective (1858), one as a dry, the other as an immersion front. He experimented widely with various materials in manufacturing lenses and followed Spencer in the use of fluorite, constructing extremely fine and highly corrected objectives that became famous. Some of these constitute prized items in various museums today.

He is best known, however, for his invention of the homogeneous immersion objective and his insistence upon the importance of aperture. The earlier achromatic lenses had small apertures, admitting relatively little light, and lacked brilliance. Tolles engaged in a celebrated controversy with the English amateur, Francis H. Wenham, concerning the merits of high apertures — wide angles of entrance of light rays into a lens system — and as to the limit such angles could attain. To the consternation of his opponents, Tolles calculated and manufactured, in 1873, a 1/10-inch three-system immersion objective, 1.25 N.A., with an aperture of more than 110° in balsam, corresponding to infinitely near 180° in air, a feat which had been declared impossible. This objective was exhibited in 1874, four years before the homogeneous immersion objectives of Zeiss. Tolles used Canada balsam as his immersion medium, and demonstrated the necessity of sealing the bottom of the slide to the top surface of the condenser as well as employing the medium between the cover glass and the front component of the objective. The controversy was finally resolved in favor of Tolles in 1885, two years after his death. He is still referred to today, with reference to microscope objectives, as the greatest craftsman of them all.



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THE SCHOOL PAGE

(Continued from page 504)

American teacher. And yet I saw some very poor work being done. In general I think I can say that the best work seemed to be being done where the poorest equipment was available for use. A number of biology teachers thought it strange that I should ask them if they had any living specimens for use in their classes, and one high school physics teacher who had obviously staged a show for my benefit did not know how to make a simple electromagnet, although he was using complicated electrical equipment he had inherited from a military training setup. It was not possible to localize good or bad teaching in the country, although I have traveled to practically all geographic extremes of the country and visited all grades of educational institutions.

While one can and should praise the emphasis given to first-hand studies in the teacher-training institutions, it might be safe to suggest that the program being developed might be improved if it could be focused to be more functional in the general needs of human beings with less emphasis on the satisfaction of mere intellectual accomplishment. It may be all very well to know the anatomy of a papilionaceous flower; it might also be well to appreciate the good and bad points of such a legume as the gorse, which takes over wherever man gives it a chance to do so.

Obviously this can be only a preliminary report on a most enjoyable experience. Probably through the rest of my writing life I will be referring to what I have seen in this interesting country during the five months that precede the appearance of this article. I can only hope that there will be some in New Zealand who will have found some help from my visit to compensate for the help they have given me. I am glad I came. I shall be glad to be back, and I only hope that I can reciprocate in some way for the kindnesses shown me. I am sure there will never be any iron curtains where interchange of experiences such as I have just had are possible. Would that this idea may grow, and prosper, and bear fruit.

Village Birdsmith

Village Birdsmith is the name that John L. Lacey has adopted as his, and to justify it he has devised what he describes as a "foolproof kit for carving and painting models of song birds, upland game birds and waterfowl." The kit consists of roughed-out blocks of several birds, instructions, a carver's knife, paints and brush and other necessary items to achieve the final results. Space does not permit further details, but full information may be obtained from Mr. Lacey at 539½ Hudson Street, New York 14, N. Y. Just tell him *Nature Magazine* suggested you inquire.

Wagner Institute Courses

Members of the American Nature Association and readers of *Nature Magazine* have a splendid opportunity to take some interesting courses offered this winter at the Wagner Free Institute of Science, Montgomery Avenue and Seventeenth Street, Philadelphia 21, Pa. Courses in Geology under Professor Erling Dorf, and in Botany under Professor William Seifriz, hold particular interest. Full information about the schedule may be obtained from the Institute.

Microscope Magazine

Word comes from Harry Ross, 68 West Broadway, New York 7, N. Y., that he is able to offer up to 150 subscriptions to *Microscope and Entomological Monthly* at two dollars a year. This is an excellent British publication. Mr. Ross makes it clear that he is limited to offering only 150 at this rate, and they will be taken on a first come, first served basis.

For Hikers

Robert Shosteck, avid follower of outdoor trails, has perfected a "Trail Map of the Potomac Valley." It covers 200 miles of foot trails; includes roads, campsites and picnic areas; shows places to fish, swim and boat; locates mines, quarries, old mills, historic sites and homes; covers Nature trails and U. S. park areas, scenic points, springs, and about all the hiker would need to know. It is available from Mr. Shosteck at Silver Spring, Maryland, for fifty cents.

For Green Thumbers

My Green Thumb Garden Record. By Julia and Kendal Morton, in collaboration with Dr. Taylor R. Alexander. Coral Gables, Florida. 1949. Text House. $3.50.

This is a clever and immensely useful loose-leaf record enabling any grower of plants to make a careful record and inventory of plants, shrubs and trees under his care. It should be of great value to the professional and to every serious-minded gardener. The authors seem to have considered everything in compiling these record forms. The user should be able to identify each plant in garden, orchard or grove; determine the care best suited for each; account for success or failure; select superior types for propagation; compare notes with fellow growers; contribute knowledge to the science of gardening.

Desert Life

Let's Go to the Desert. By Harriet E. Huntington. Garden City, N. Y. 1949. Doubleday and Company. 90 pages. Illustrated with photographs by the author. $2.00.

This junior book is designed to appeal to the younger youngsters and is essentially a picture book, with brief text, of the life of the desert, with all its fascinating difference.

Of Little Songs

Of Little Songs. By Elinor Henry Brown. North Hollywood, California. 1949. The author at 11123 Erwin St. Foreword by Don Blanding. Flexible binding, $1.00; cloth $2.00.

Within these covers are collected more of Elinor Brown's delightful poetry in a fitting sequel to her earlier *The Merry-Go-Round Has Wings* and *Dream Awake and Remember.* This is a charming little book for all lovers of poetry. With this latest collection comes, also, a little volume entitled *The Two Stones,* by Wilfred Brown, radio news editor and Mrs. Brown's husband. It appears between covers "just so I can say that I'm an author, too!" It treats with two stones — Ignatius and Sylvanus — fine granite boulders. Sylvanus gathered moss and wound up as decomposed granite; Ignatius was a rolling stone and ended in a cemetery, where, also, Sylvanus was used on the walks. The bibliography that accompanies this "deep" treatise is charming and exhaustive. The edition is small, and copies are a quarter as long as they last, and until they become rare books worth ten dollars.

Young Forester

Paul Tiber: Forester. By Maria Gleit. New York. 1949. Charles Scribner's Sons. 209 pages. $2.50.

Paul Tiber was the son of a Pennsylvania miner who swore that no son of his should toil in a mine. Nor did Paul want to, since he yearned to plant and care for trees. But the family was large and opportunity limited. Yet Paul did become a forester. While this is a fictionized story, it is also true, and the real person who provided the inspiration for the story is today a leading forester.

Kildee House

Kildee House. By Rutherford Montgomery. Garden City, N. Y. 1949. Doubleday and Company. 209 pages. Illustrated by Barbara Cooney. $2.50.

This is not a story of kildeer but a fiction story for young people about Jerome Kildee and the house he built against a giant redwood tree. It is also the story of Old Grouch, a raccoon who lived in the redwood, and of the spotted skunks who took up residence beneath the home of Kildee. The author lives among the redwoods and writes from personal acquaintance of the life found there.

Measuring Radioactivity

Radioactive Measurements with Nuclear Emulsions. By Herman Yagoda. New York. 1949. John Wiley and Sons. 356 pages. Illustrated. $5.00.

This book provides a description of the theory and practice of nuclear emulsion technique so that, with the aid of this book, any scientist with a microscope can make quantitative radioactive measurements.

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